No. 6357.56 29, 1895.

ENGINEERING DEPARTMENT.

TWENTY-NINTH ANNUAL REPORT

OF THE

CITY ENGINEER,

BOSTON,

FOR THE YEAR 1895.

Printed for the Department.

BOSTON:
ROCKWELL AND CHURCHILL, CITY PRINTERS.
1896.

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TWENTY-NINTH ANNUAL REPORT

OF THE

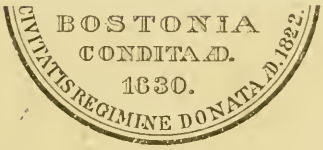
CITY ENGINEER,

BOSTON,

With Compliments of

William Jackson,

City Engineer.



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OF THE
CITY OF BOSTON

Jan 19, 1904

Engineering Department, City Hall,
Boston, February 1, 1896.

Hon. Josiah Quincy,
Mayor of the City of Boston:

Sir: In compliance with the Revised Ordinances the following report of the expenses and operations of the department for the year ending January 31, 1896, is submitted:

The report of the work done by this department may be classified under the following heads:

A. — The examination and supervision of structural repairs of bridges, the designing and superintending the construction of new bridges, retaining-walls, city wharves, etc., and in miscellaneous engineering work called for by the City Council, the giving of lines and grades for property-owners and builders, the making of plans and profiles for the Street Commissioners, and the making of survey plans, etc., for the various city departments.

B. — Charge of the engineering work in connection with the Sudbury-river, Cochituate, and Mystic Water-Works, including charge of new constructions for these works.

C. — Charge of the construction of a system of intercepting and outlet sewers.

D. — Charge of the engineering work in connection with the parks.

E. — Charge of the engineering work, except for Sewer Division, in connection with the Street Department.

The expenses incurred under the head "C" are paid wholly from a special appropriation.

A.

The following is a statement of engineering expenses from February 1, 1895, to January 31, 1896:

Amount of department appropriation for 1895–96	$40,000 00
Transferred from Surveying Department	13,500 00
	$53,500 00
Amount expended from department appropriation for 1895–96	53,495 31
Unexpended balance	$4 69

Statement of Expenditures, Department Appropriation.

Object of expenditures:

Salaries of City Engineer, assistants, draughtsmen, transitmen, levellers, rodmen, etc.	$47,059 81
Engineering instruments and repairs of same	691 21
Drawing-paper, and all materials for making plans	982 85
Stationery, printing-stock, note-books, postage, etc.	520 20
Printing	426 94
Reference library, binding books, and photographs of works	976 55
Expenses of Charlestown Bridge Committee,	
Travelling expenses (including horse-keeping, repairs on vehicles, etc.)	1,224 36
Telephone service	190 50
Furniture cases for plans and books, etc.	272 10
Blue-process printing	191 86
Incidental expenses, and all other small supplies	958 93
Total	$53,495 31

By chapter 449, Acts of 1895, the Surveying Department was consolidated with the Engineering Department on July 1, 1895.

Appropriation for financial year 1895–96 .		$35,000 00
Amount transferred to Street Laying-out Department by order of the City Council, dated June 26, 1895 . .	$2,053 56	
Amount expended from February 1, 1895, to July 1, 1895	19,446 44	
Amount expended from July 1, 1895, to February 1, 1896	13,497 11	
		34,997 11

The unexpended balance of $13,500, remaining July 1, 1895, was transferred to the Engineering Department by order of the City Council, dated June 26, 1895.

The expenditures of the Surveying Department from February 1, 1895, to July 1, 1895, were as follows:

Salaries	$17,581 81	
Incidental expenses, viz., carfares, ferry tolls, travelling expenses, and small supplies for office	571 72	
Horse-hire, repairing carriage, etc.	540 34	
Drawing-paper and materials,	160 35	
Report and information relating to public docks . .	128 62	
Binding and repairing plans in volumes . . .	125 00	
Stationery, note-books, etc. .	112 61	
New instruments and repairing	111 69	
Telephone	60 00	
Furniture, repairs, etc. .	28 85	
Hardware	13 05	
Books, directories, etc. .	11 00	
Printing	1 40	
		$19,446 44

IMPROVED SEWERAGE.

Total appropriations	$6,375,404 96

Statement of Expenses from February 1, 1895, to February 1, 1896.

Object of expenditure:		
General office expenses		$4,300 55
East Shaft Roadway		500 00
Section 7, Dorchester Intercepting Sewer .		300 00
" 8, " " " .		499 32
" 9, " " " .		3,960 70
" 11, " " " .		19,472 81
Neponset Intercepting Sewer . . .		4,473 74
		$33,507 12
Loans negotiated (less $67,500 transferred) .	$6,308,664 03	
Revenue	66,740 93	
		$6,375,404 96
Expended previous to February 1, 1895 . .	$6,307,754 96	
Expended from February 1, 1895, to February 1, 1896,	33,507 12	
		6,341,262 08
Balance February 1, 1896		$34,142 88

IMPROVED SEWERAGE CONSTRUCTION, 1895.

Tables showing the cost of the sewer sections in progress during the year 1895, and other miscellaneous work:

General Office Expenses.

Items of expenditure:	
Salaries	$3,094 19
Engineering instruments and repairs . .	116 42
Drawing-paper and materials for plans .	7 88
Stationery and printing-stock . . .	31 12
Travelling expenses	164 41
Telephone	30 00
Blue-process printing	19 02
Sundry small supplies	112 02
Office rent	522 69
Rubber clothing	20 80
Painting, electric wiring, etc., Room 67, City Hall	182 00
	$4,300 55

EAST SHAFT ROADWAY.

Item of expenditure:

Displacement of tide-water (Com. of Mass.),	$500 00
	$500 00
Expended previous to 1895 . . .	5,097 54
	$5,597 54

NEPONSET INTERCEPTING SEWER.

Items of expenditure:

Bricks	$38 80
Cements	71 20
Coal	26 24
Drain pipe	178 01
General supplies	235 19
Hardware	734 31
Insurance	130 00
Labor	2,452 19
Lumber	239 05
Sand and gravel	48 25
Teaming	66 50
Rent of machinery	254 00
Total	$4,473 74

SECTION 7, DORCHESTER INTERCEPTING SEWER.

Item of expenditure:

Land damages, Jane W. Robinson . .	$300 00
	$300 00
Expended previous to 1895 . . .	37,403 89
Total	$37,703 89

SECTION 8, DORCHESTER INTERCEPTING SEWER.

Items of expenditure:

Land damages, Thomas Mullen heirs .	$419 32
Miscellaneous	80 00
	$499 32
Expended previous to 1895 . . .	39,548 94
Total	$40,048 26

Section 9, Dorchester Intercepting Sewer.

Items of expenditure:

Bricks	$430 50
Drain pipe	18 39
Cement	135 75
Teaming	46 50
Coal	132 76
General supplies	171 44
Sand and gravel	311 15
Lumber	17 79
Labor	2,491 42
Construction damages	205 00
	$3,960 70
Expended previous to 1895	37,585 75
Total	$41,546 45

Section 11, Dorchester Intercepting Sewer.

Items of expenditure:

Advertising	$31 75
Bricks	1,543 48
Cement	833 30
Coal	124 28
Drain pipe	174 41
General supplies	1,037 69
Hardware	33 43
Insurance	130 00
Labor	14,566 47
Lumber	205 17
Miscellaneous	8 90
Rent of machinery	108 00
Rubber clothing	73 68
Sand and gravel	308 00
Teaming	263 50
Cut granite stones	30 75
	$19,472 81

ABOLISHMENT OF GRADE CROSSINGS.

Dover-street Bridge.

Expenditures from February 1, 1895, to February 1, 1896:

Rent (Blacker & Shepards, wharf for passageway and repairing same after being used by the city)	$490 00
Installing motor for draw (General Electric Co.)	373 17
	$863 17
Expended previous to 1895 . . .	129,590 15
	$130,453 32

REBUILDING BRIDGES TO WATERTOWN.

Appropriation, Western avenue and North Beacon street . . .	$18,000 00	
Transferred August 1, 1894, to Franklin street tunnel, Brighton	1,500 00	
		$16,500 00
Expended previous to February 1, 1895 .		10,983 64
Balance February 1, 1896 . .		$5,516 36

No expenditure during the year of 1895.

STATUES.

Robert G. Shaw Monument.

Appropriation, Robert G. Shaw monument,		$19,500 00
Items of expenditure:		
Norcross Brothers, third, fourth, and fifth estimate on base and pedestal . .	$5,595 49	
	$5,595 49	
Expended previous to 1895 .	11,928 40	
		17,523 89
Balance February 1, 1896 . . .		$1,976 11

John Boyle O'Reilly Monument.

Appropriation from Phillips Street-fund Income		$3,500 00
Items of expenditure:		
John Harrington, steps and seats	$1,629 00	
Pay Rolls, labor and teaming,	363 84	
Walker & Kimball, architects' commissions . . .	167 90	
A. A. Libby & Co., labor and stock	140 25	
Curtis & Pope, cement .	56 40	
	$2,357 39	
Expended previous to 1895 .	1,000 00	
		3,357 39
Balance February 1, 1896		$142 61

BRIDGES.

The annual inspection of all highway and foot bridges has been made, together with special examinations and inspections when notified by the Superintendent of Streets of the progress of repairs.

In the list of bridges, those marked with a star (*) are over navigable waters, and are each provided with a draw, the openings in which are shown in a table in Appendix A. The widths of the openings have been measured for this report.

I. — BRIDGES WHOLLY SUPPORTED BY BOSTON.

Agassiz bridge, in Back Bay Fens.

Allston bridge, over Boston & Albany Railroad, Brighton.

Arborway bridge, over Stony brook.

Ashland street, over Providence Division, N.Y., N.H., & H. R.R., West Roxbury.

Athens street, over New England Railroad.

Audubon road, over Boston & Albany Railroad.

Beacon street, over outlet to Back Bay Fens.

Beacon street, over Boston & Albany Railroad.

Berkeley street, over Boston & Albany Railroad.

Berkeley street, over Providence Division, N.Y., N.H., & H. R.R.

Bernier-street foot-bridge (in the Riverway).
Berwick-park foot-bridge, over Providence Division, N.Y., N.H., & H. R.R.
Blakemore street, over Providence Division, N.Y., N.H., & H. R.R.
Bolton street, over New England Railroad.
Boylston street, in Back Bay Fens.
Boylston street, over Boston & Albany Railroad.
Bridle path in the Riverway, over Muddy river.
*Broadway, over Fort Point channel.
Broadway, over Boston & Albany Railroad.
Brookline avenue, over Boston & Albany Railroad.
Byron street, over Boston, Revere Beach, & Lynn Railroad.
*Castle-island foot-bridge, from Marine park, South Boston, to Castle island.
*Charles river, from Boston to Charlestown.
Charlesgate, Back Bay Fens, over Boston & Albany Railroad.
*Chelsea, South, over South channel of Mystic river.
*Chelsea street, from East Boston to Chelsea.
Circuit drive, over Scarboro' pond in Franklin park.
Columbus avenue, over Boston & Albany Railroad.
*Commercial point, or Tenean, Dorchester.
Commonwealth avenue, in Back Bay Fens.
*Congress street, over Fort Point channel.
Cornwall street, over Stony brook, West Roxbury.
Cottage Farm bridge, Brighton.
Cottage-street foot-bridge, over flats, East Boston.
Dartmouth street, over Boston & Albany Railroad and Providence Division, N.Y., N.H., & H. R.R.
*Dover street, over Fort Point channel.
Ellicott arch, in Franklin park.
*Federal street, over Fort Point channel.
Fen bridge, Back Bay Fens.
Ferdinand street, over Boston & Albany Railroad.
Forest Hills entrance, in Franklin park.
Gold street, over New England Railroad.
Huntington avenue, over Boston & Albany Railroad.
Irvington-street foot-bridge, over Providence Division, N.Y., N.H., & H. R.R.
*L street, over Reserved channel, South Boston.
Leverett-pond foot-bridge, in Leverett park.
Leyden street, over Boston, Revere Beach, & Lynn Railroad.
Linden Park street, over Stony Brook.
*Malden, from Charlestown to Everett.

Massachusetts avenue, over Boston & Albany Railroad.
Massachusetts avenue, over Providence Division, N.Y., N.H., & H. R.R.
*Meridian street, from East Boston to Chelsea.
*Mount Washington, over Fort Point channel.
Neptune road, over Boston, Revere Beach, & Lynn Railroad.
Newton street, over Providence Division, N.Y., N.H., & H. R.R.
Public Garden foot-bridge.
Roxbury Crossing foot-bridge, over Providence Division, N.Y., N.H., & H. R.R.
Scarboro' pond foot-bridge (in Franklin park).
Shawmut avenue, over Boston & Albany Railroad.
Stony brook, Back Bay Fens.
Swett street, east of New England Railroad.
Swett street, west of New England Railroad.
*Warren, Boston to Charlestown.
West Rutland square foot-bridge, over Providence Division, N.Y., N.H., & H. R.R.
Winthrop, from Breed's island to Winthrop.

II. — Bridges of which Boston supports the Part within its Limits.

Bellevue street, in the Riverway, over Muddy river.
Bernier-street foot-bridge, in the Riverway, over Muddy river.
Brookline avenue, in the Riverway, over Muddy river.
*Cambridge street, from Brighton to Cambridge.
Central avenue, from Dorchester to Milton.
*Chelsea, North, over North Channel, Mystic river.
*Essex street, from Brighton to Cambridge.
*Granite, from Dorchester to Milton.
Longwood avenue, from Roxbury to Brookline.
Mattapan, from Dorchester to Milton.
Milton, from Dorchester to Milton.
*Neponset, from Dorchester to Quincy.
*North Beacon street, from Brighton to Watertown.
*North Harvard street, from Brighton to Cambridge.
Spring street, from West Roxbury to Dedham.
Tremont street, in the Riverway, over Muddy river.
*Western avenue, from Brighton to Cambridge.
*Western avenue, from Brighton to Watertown.

III. — BRIDGES OF WHICH BOSTON PAYS A PART OF THE COST OF MAINTENANCE.

Albany street, over Boston & Albany Railroad.
*Canal, from Boston to Cambridge.
Chelsea bridge, over the Boston and Maine Railroad.
Dorchester street, over Old Colony Division, N.Y., N.H., & H. R.R.
Everett street, over Boston & Albany Railroad, Brighton.
*Harvard, from Boston to Cambridge.
*Prison Point, Charlestown to Cambridge.
*West Boston, from Boston to Cambridge.
West Fourth street, over Old Colony Division, N.Y., N.H., & H. R.R.

IV. — BRIDGES SUPPORTED BY RAILROAD CORPORATIONS.

1st. — Boston & Albany Railroad.

Harrison avenue.
Market street, Brighton.
Tremont street.
Washington street.

2d. — Boston & Maine Railroad, Western Division.

Main street.
Mystic avenue.

3d. — Boston & Maine, Eastern Division.

Main street.
Mystic avenue.

4th. — Boston, Revere Beach, & Lynn Railroad.

Everett street.

5th. — New England Railroad.

Broadway.
Dorchester avenue.
Fifth street.
Fourth street.
Harvard street, Dorchester.
Morton street, Dorchester.
Norfolk street, Dorchester.
Norfolk street, Dorchester.

Second street.
Silver street.
Sixth street.
Third street.
Washington street, Dorchester.

6th. — New York, New Haven, & Hartford Railroad, Old Colony Division.

Adams street.
Ashmont street and Dorchester avenue.
Cedar Grove cemetery.
Commercial street.
Savin Hill avenue.

7th. — N. Y., N.H., & H. R.R., Providence Division.

Beech street, West Roxbury.
Bellevue street, West Roxbury.
Canterbury street, West Roxbury.
Centre street, or Hog bridge.
Centre and Mt. Vernon streets.
Dudley avenue.
Park street.

RECAPITULATION OF BRIDGES.

I.	Number wholly supported by Boston . .	65
II.	Number of which Boston supports that part within its limits	18
III.	Number of which Boston pays a part of the cost of maintenance	9
IV.	Number supported by railroad corporations:	
1.	Boston & Albany	4
2.	Boston & Maine, Western Division . .	2
3.	" " Eastern Division . .	2
4.	Boston, Revere Beach, & Lynn Railroad .	1
5.	New England Railroad	13
6.	N.Y., N.H., & H. R.R., Old Colony Division,	5
7.	" " Providence Division,	7
	Total	126

Agassiz-road Bridge (in Back Bay Fens).

This bridge was built in 1887, of brick and stone masonry. It is maintained by the Park Department, and is in good condition.

Albany-street Bridge (over the Boston & Albany R.R.).

This is an iron bridge; the present structure was built in 1886–87. It is maintained in part by the city of Boston and in part by the Boston & Albany Railroad Company. No painting has been done to the iron-work below the floor since the bridge was built; it is therefore in a very rusty condition. As parts of the lower flooring need renewing, it is recommended that this bridge be thoroughly cleaned and painted this year.

Allston Bridge (over the Boston & Albany R.R., Brighton).

This is an iron bridge built in 1892. The portion under the floor should be painted this year.

Arborway Bridge (over Stony Brook, in Parkway, near Forest Hills Station).

This is a wooden bridge resting on abutments of vulcanized spruce piles. The stringers and under-planking are of vulcanized hard-pine. It was built in 1893, and is maintained by the Park Department.

Ashland-street Bridge (over Providence Division, N.Y., N.H., & H. R.R., West Roxbury).

The present structure is of iron, and was built in 1875. The iron-work is in good condition, but the fences are poor and should be rebuilt.

Athens-street Bridge (over New England R.R.).

This is an iron bridge, built in 1874. It should be painted and the sidewalks repaired.

Audubon-road Bridge (over the Boston & Albany R.R.).

This is a steel plate girder bridge, built in 1893–94, and is in good condition. It is maintained by the Park Department.

Beacon-street Bridge (over Outlet of Back Bay).

This is an iron bridge, built in 1880–81. It is in fair condition.

Beacon-street Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1884–85, widened in 1887–88, and the central roadway further widened in 1890 for the

convenience and at the expense of the West End Street Railway Company. The wooden facias and wheel-guards should be repaired and the upper portions of the bridge painted.

Bellevue-street Bridge (over Muddy River, in the Parkway).

This is a segmental masonry arch of 44 ft. span and 15 ft. rise. The foundation is of concrete, the face walls of seam-faced granite, and the arch of brick. It was built in 1893 by the Park Departments of Boston and Brookline, and is maintained jointly by them.

Bernier-street Foot-bridge (over Bridle Path, in Riverway).

This is a semicircular masonry arch of 38 feet 4 inches span. The foundations are of concrete, the exposed face walls of seam-faced granite, and the arch is of brick, the face brick being buff-colored. It was built in 1893, and is maintained by the Park Department.

Bernier-street Foot-bridge (over Muddy River).

This is a segmental masonry arch of 52 feet span and 14 feet rise. The foundations are of concrete, the exposed face walls are of seam-faced granite, and the arches of brick. It was built in 1893 by the Park Departments of Boston and Brookline, and is maintained jointly by them.

Berkeley-street Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1891, and is now in good condition. The portion of the bridge under the floor begins to show signs of rust, and should be painted next year. The railing put up in 1892 received but one coat of paint; this has now nearly disappeared, and the iron is rusting very badly. The recommendations made last year, that this be painted and that the temporary railing at the north-easterly corner be replaced by a more permanent fence, are repeated this year.

Berkeley-street Bridge (over Providence Division, N.Y., N.H., & H. R.R.).

This bridge has been reported for a number of years to be in bad condition, and only such repairs as seemed absolutely necessary have been made.

Berwick-park Foot-bridge (over Providence Division, N.Y., N.H., & H. R.R.).

This is an iron foot-bridge, erected in 1894. The iron stairs and piers were new, but the trusses and floor-beams were those built at Franklin street in 1883. It is in good condition.

Blakemore-street Bridge (over Providence Division, N.Y., N.H., & H. R.R.).

This is an iron bridge. It was built in 1881–82, and is in good condition.

Bolton-street Bridge (over New England R.R.).

This is a wooden bridge, built in 1889. The fences should be painted and sanded.

Boylston-street Arch Bridge (in Back Bay Fens).

This is a stone arch bridge, built in 1881. It is in good condition.

Boylston-street Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1886–88. During the past year the lower floor was taken off and the iron-work cleaned and painted. A new hard-pine lower floor was put on, and the bridge is now in good condition, with the exception of the facia, which should be put in good order.

Bridle-path Bridge, in the Riverway (over Muddy River).

This is a masonry bridge of three arches; the central arch is elliptical in form, with a span of 30 feet and a rise of 9 feet 6 inches; the side arches are semicircular, 15 feet in diameter. The face work is of seam-faced granite and the arches are of brick. It was built in 1894 and is maintained by the Park Department.

Broadway Bridge (over Fort Point Channel).

This is an iron bridge. It was built in 1869–71, and the draw and its foundation were rebuilt in 1874–75. The bridge was temporarily strengthened so as to allow electric cars to use it in 1893. The lower chords of the trusses over the railroad have been boxed in, a new sidewalk has been built on the city side of the Lehigh-street span, the upper part of the bridge has been painted two coats, and minor re-

pairs have been made. The deck of the draw needs renewal, the draw foundation needs pointing, and the draw should be adjusted so it can be reversed.

The draw and draw foundations are otherwise in good condition and present a creditable appearance; the remaining parts of the bridge are old and patched and should be rebuilt.

Broadway Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1880–81. An examination of this bridge was made in October, 1895, in consequence of which a report was sent to the Street Department recommending that the iron-work below the floor be painted at once. As the new floor of hard-pine laid in 1892 would not require renewing for five or six years at least, it was further recommended that the painting be done from the under side, even if it should be found necessary to have the work done on Sundays, the additional expense being warranted by the rapid wasting of the structure in its present condition. Nothing, however, has been done as yet towards carrying out these recommendations.

In the annual report for 1892, in alluding to the new floor put on this bridge, attention is called to the folly of putting an under floor on a low bridge over a railroad where there is much traffic, which will last more than four years, because of the rapid deterioration of the iron unless it is frequently cleaned and painted, and this work is not usually done except when the lower floor is renewed. The fence on this bridge is in poor condition, and should be repaired as recommended in last year's report.

Brookline-avenue Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1884. It is now in good condition. There is a guy attached to one of the top chords of this bridge, and as the truss has no top lateral bracing there is nothing to prevent the chord being thrown out of alignment.

Brookline-avenue Bridge (over Muddy River, in the Riverway).

This is a semicircular masonry arch of 15 feet span. The abutments and face walls are of granite, resting on a pile and timber foundation. The face walls are of seam-faced granite. The arch is of brick. It was built in 1892 by the Park Departments of Boston and Brookline, and is maintained by them jointly.

Byron-street Bridge (over Boston, Revere Beach, & Lynn R.R.).

This is a wooden bridge, built in 1889. The roadway plank is in poor condition and will need attention.

Cambridge-street Bridge (from Brighton to Cambridge).

This is a wooden pile bridge with a wooden leaf draw. The city maintains the part within its limits. It was rebuilt in 1884; the draw was rebuilt in 1891. The draw-pier is too short to accommodate the larger class of vessels that the widening of the draw-way allows to pass through the bridge. A new boat, a buoy, and a better house should be provided at this bridge; the fender-guard, pier, and water-way need repairing. The deck of the bridge is getting old and will need watching.

Canal or Craigie's Bridge.

This is a wooden pile bridge, with wooden turn-table draw. The city pays one-half the cost of maintenance. The bridge was originally built in 1808, was rebuilt in 1852, and again rebuilt and widened in 1874. The bridge is in the care of a commission, consisting of one commissioner from Boston and one from Cambridge. The down-stream sidewalk and fence on the draw have been rebuilt, several bents on the Cambridge end of the bridge have been capped and braced, and other ordinary repairs made by the aid of the men employed on the bridge. The flooring of the sidewalks near the Cambridge end and the paving are in bad condition. The water-way needs repairing by driving a few piles, refastening the spur shores and wales, and the addition of some planking, and some of the blocks on the draw need renewal.

Castle-island Foot-bridge (from Marine Park to Castle Island).

This is a temporary foot-bridge built in 1892, and is maintained by the Park Department. It connects the Marine park with Castle island, and is furnished with a draw, so that, if desired by the United States authorities, the island can be cut off from the shore. The fencing needs painting and the draw needs setting up. Otherwise the bridge is in good condition.

Central-avenue Bridge (over Neponset River, Dorchester Lower Mills).

This is an iron bridge, and was built in 1876. The city maintains the part within its limits. The bridge should be stripped and painted, the wood-work renewed, and the abutment pointed.

Charles-river Bridge (from Boston to Charlestown).

This is a wooden pile bridge with an iron draw. The present bridge was built in 1854-55; the draw was built in 1870. The draw foundation and draw have been repaired, and one bent of piles that was settling has been strengthened by driving additional piles. The main part of the bridge is now in safe condition, but the piers and water-ways need repairing, the end of the easterly draw pier being in a dangerous condition and too short.

See page 145.

Charlesgate (in Back Bay Fens, over Boston & Albany R. R.).

This is an iron bridge, and was built in 1881-82. It is maintained by the Park Department.

See page 118.

Chelsea Bridge (over Boston & Maine R.R.).

This bridge extends from Chelsea Bridge North to Chelsea Bridge South, over the location of the Boston & Maine Railroad, and was built by the railroad company in accordance with a decree of the Superior Court, under chap. 374 of the Acts of 1892.

This bridge is a deck plate girder bridge of 21 spans from 40 ft. to 70 ft. in length, with trestle post supports resting on masonry piers. It has one stone-paved roadway 45 ft. wide between curbs, and one plank sidewalk 8 ft. wide. Public travel was turned over the bridge at the time of the opening of the draw in Chelsea Bridge North to travel, December 28, 1895. The surface of this bridge is to be maintained and kept in repair by the city.

Chelsea Bridge North (over North Channel, Mystic River).

The city maintains the part within its limits. The original structure was built in 1802–3; the piles of the present bridge were driven in 1880.

That part of the bridge above the caps from the abutment to within about 86 feet of the draw has been rebuilt by the Boston & Maine Railroad. The draw and draw foundation and the upper part of the remainder of the bridge belonging to the city have been rebuilt by this department.

See page 146.

Chelsea Bridge South (over South Channel, Mystic River).

This is a pile bridge, with an iron draw. The original bridge was built in 1802–3. The piles of the present bridge were driven, and the draw was built, in 1877. That part of the bridge above the girder caps has been rebuilt at a higher grade, and the draw raised, by the Boston & Maine Railroad.

The draw has been painted, and has an entire new floor of hard-pine stringers and a calked deck of kyanized spruce. This work was done by the Street Department.

Chelsea-street Bridge (from East Boston to Chelsea).

This is a pile bridge, with an iron swing draw; the original bridge was built in 1834; was rebuilt in 1848, 1873, and again in 1894–95. The new bridge was opened to team travel February 26, 1895. The bridge is in good condition.

Circuit-drive Bridge (over Scarboro' Pond, in Franklin Park).

This is an elliptical masonry arch of 30 feet span and 6 feet 3 inches rise. The abutments are of granite ashlar backed by concrete; the face walls are of seam-faced granite, and the arch is of brick. It was built in 1893, and is maintained by the Park Department.

Columbus-avenue Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1876–77. The iron-work below the floor is somewhat rusty; otherwise the bridge is in good condition. As reported last year, "It is still made an anchorage for telegraph-pole guys," which should be removed.

Commercial Point or Tenean Bridge (Dorchester).

This is a wooden pile bridge, with a wooden leaf draw. The present bridge was built in 1875. A new deck of 4-inch spruce has been put on the pile bridge, and the fences have

been repaired. The stringers on the bridge and draw are not in good condition, and the draw should be rebuilt. The bulkhead at the Boston end is in a dangerous condition, and the draw machinery should be put in repair.

Commonwealth-avenue Bridge (in Back Bay Fens).

This is an iron bridge. It was built in 1881–82, and is in good condition.

Congress-street Bridge (over Fort Point Channel).

This is a wooden pile bridge, with an iron turn-table draw on a stone foundation, and was built in 1874–75. The under floor of the bridge should be thoroughly repaired. It should be uncovered so that its condition can be ascertained, and it is probable that it will require an entirely new floor under the sidewalk and roadway. Part of the sidewalk and roadway is in need of immediate repairs. The upper part of the pier should also be uncovered and examined, and will probably need extensive repairs. The landings of the draw need rebuilding. The sidewalk, bulkhead, and fencing are poor and several of the piles are rotten at the top. The track, wheels, and other portions of the turn-table are badly worn and require constant attention. Extensive repairs are needed to put the draw in condition to meet the heavy service it is called upon to perform. The wood-work at the ends of the draw is badly split and should be repaired.

Cornwall-street Bridge (over Stony Brook, West Roxbury).

This is a small wooden bridge, built in 1892. It is in good condition, except that the outlets for water are insufficient, the bridge being at the foot of the grade at either end.

Cottage Farm Bridge (over B. & A. R.R., Brighton).

See page 147.

Cottage-street Foot-bridge (over Flats, East Boston).

This is a wooden pile bridge, built in 1889 for foot travel only. Several pieces of cross-bracing that have been carried off by the ice should be replaced, and others that are soft or split at the ends should either be refastened or replaced. The floor plank needs renewing in several places, and a few fence rails at the ends of the bridge should be renewed. The bridge is otherwise in good condition.

Dartmouth-street Bridge (over B. & A. R.R. and Providence Division, N.Y., N.H., & H. R.R.).

This is an iron bridge, built in 1878–79. The bridge should be painted, and the wooden boxing around the ends of the floor-beams should be repaired. The network of wires which has been placed on this bridge disfigures it badly and should be removed.

Dorchester-street Bridge (over Old Colony Division, N.Y., N.H., & H. R.R.).

This is an iron bridge, built in 1869. It is principally maintained by the railroad company, and was repaired in 1893 as thoroughly as it could be without building new girders.

Dover-street Bridge (over Fort Point Channel).

This was originally a wooden pile bridge, built in 1805, rebuilt in 1858–59, and again in 1876. In 1893–94, upon the abolition of the grade crossing of the Old Colony Railroad, the present iron structure, resting on masonry piers, was built. The bridge is in good condition. A portion of the foundation of the old draw was not removed at the time the present bridge was built, and its very dilapidated condition is not in keeping with the rest of the bridge.

Ellicott-arch Bridge (in Franklin Park).

This is a semicircular masonry arch of 17 feet 6 inches span. It was built in 1889, and is maintained by the Park Department.

Essex-street Bridge (from Brighton to Cambridge).

The city maintains the part within its limits. This is a wooden pile bridge, with a wooden leaf draw, and was originally built in 1850; the draw was rebuilt in 1891. This is an old bridge and is in poor condition. Steps have been taken by the City Council, in connection with the city of Cambridge, looking toward building a new bridge in another location. Meanwhile this bridge should be watched and kept in safe condition.

Everett-street Bridge (over B. & A. R.R., Brighton).

This is an iron bridge, built in 1891, by the Boston & Albany Railroad. It is in good condition.

Federal-street Bridge (over Fort Point Channel).

This is a wooden pile bridge, with a double retractile iron draw, and was rebuilt in 1891–92. The upper part and sides of the bridge and the buildings have been painted. New rolls are needed for the cables, and the machinery under the wharf on the Boston side should be protected from slush, if the dumping of snow from the wharf is to be continued. The bridge is in good condition.

Fen Bridge (in Back Bay Fens).

This bridge was built in 1891–92. It is in good condition.

Ferdinand-street Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1892. The lower planking should be renewed, and the iron-work below cleaned and painted. The fence on the north-west retaining-wall adjoining the bridge, which was badly injured by fire in 1891, has never been properly repaired. When any work is done at the bridge, this fence should be put in good order.

Forest Hills Entrance Bridge (in Franklin Park).

See page 120.

Gold-street Bridge (over New England R.R.).

See page 147.

Granite Bridge (from Dorchester to Milton).

This is a wooden pile bridge with a wooden leaf draw. The city maintains the part within its limits. The bridge was originally built in 1837. The sidewalk plank needs renewal; the abutment should be repaired, and the fences on the draw need painting; otherwise the bridge is in fair condition.

Harvard Bridge (from Boston to Cambridge).

This is an iron bridge with an iron turn-table draw, and was built in 1887–91. The bridge is in the care of two commissioners, one appointed from Boston and one from Cambridge, and the expense of maintenance is borne equally by each city. The roadway of the bridge for its entire length was sheathed in October, 1895. The surface of the sidewalks is badly cracked, and the recommendation in the last annual report is here renewed, that the contractors who

put down the asphalt be required to restore these walks to a satisfactory condition, in compliance with their guarantee. No painting has been done during the past year, and with the exception of the fences, which were painted in 1893, nothing has been done to the iron-work in the line of painting since the bridge was built. The recommendation of last year, that it be cleaned and painted this year, is here repeated.

Huntington-avenue Bridge (over Boston & Albany R.R.).

This is an iron bridge. It was built in 1872, and in 1876–77 the abutments were rebuilt and the bridge widened by the addition of two new girders. Plans have been prepared for a new floor for this bridge which will conform to the new grade of the avenue, and the work will be commenced early in the coming season.

Irvington-street Foot-bridge (over Providence Division, N.Y., N.H., & H. R.R.).

This is an iron foot-bridge, built in 1892. It is in good condition.

L-street Bridge (over Reserved Channel, South Boston).

This is a wooden pile bridge with an iron retractile draw. It was built in 1892. The blocking for the engine needs refastening, and the draw needs painting.

Leverett-pond Foot-bridge (in Leverett Park).

This is a segmental masonry arch of 24 feet span and 5 feet 5 inches rise. The abutments are of concrete, faced with granite; the exposed face-work is of seam-faced granite, and the arch is of brick. It was built in 1894, and is maintained by the Park Department.

Leyden-street Bridge (over Boston, Revere Beach, & Lynn R.R.).

This is an iron bridge, built in 1889. The sidewalk floor should be renewed and the fence rails painted; the roadway plank should be examined.

Linden Park-street Bridge (over Stony Brook).

This is a wooden bridge, built in 1887. It is in fair condition.

Longwood-avenue Bridge (from Roxbury to Brookline).

This is a wooden bridge, supported by wooden posts, and was built in 1877. The portion of the bridge maintained by Boston is in very poor condition, and must be watched carefully to keep it in a safe condition for travel. The construction of Riverdale Park, which the bridge crosses, will hasten, it is hoped, the removal of this bridge.

Malden Bridge (from Charlestown to Everett).

The present structure was built in 1875 and the draw in 1892. Only minor repairs have been made. The draw runs hard, and it should be adjusted. The cross-bracing, fender-guard, fences, and sidewalk are in very poor condition; the draw-piers are old, weak, and are too short.

Massachusetts-avenue Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1876. It was thoroughly repaired in 1893, with the exception of the wooden fences. Both fences are now somewhat decayed, and that on the westerly side has been pulled out of line by a telegraph pole which is attached to the girder. The recommendation made last year is repeated this year, that, as other means are available for supporting the telegraph wires now on this bridge, they should be removed without further delay.

Massachusetts-avenue Bridge (over Providence Division, N.Y., N.H., & H. R.R.).

This is an iron bridge, built in 1876. It is in good condition.

Mattapan Bridge (from Dorchester to Milton).

The city maintains the part within its limits. This is an old iron bridge and is in a dangerous condition, and it should be replaced by a stone bridge.

Meridian-street Bridge (from East Boston to Chelsea).

This is a wooden pile bridge, with a wooden turn-table draw on a pile foundation. The original structure was built in 1858. It was rebuilt soon afterwards, and was widened and rebuilt in 1884, excepting the draw, which was built in 1875–76. The draw is in a dangerous condition, and should be replaced by a new structure; during the year it became necessary to reinforce one of the trusses, which had begun to cripple. The draw-piers are in poor condition; the con-

crete sidewalks, water-ways, fence on draw, and cross-bracing on bridge need repairs.

Milton Bridge (from Dorchester to Milton).

The city maintains the part within its limits. The original structure is very old. It was widened in 1871–72. The older part of this bridge was built of stone, and the widening is an iron structure on stone columns. The sidewalks need repairs; otherwise the bridge is in fair condition.

Mt. Washington-avenue Bridge (over Fort Point Channel).

This is a wooden pile bridge with an iron draw. It was built in 1854, and rebuilt in 1870–71. This is the only draw of importance in the city that is moved by hand power. The draw-pier is in poor condition, and it is so low that it is covered with water at every high course of tides. The pavement, the concrete, the sidewalk flooring on the draw, and the fender guard are in poor condition. The water-ways should be repaired, and the draw should be adjusted so it can be reversed.

Neponset Bridge (from Dorchester to Quincy).

The city maintains the part within its limits. The original structure was built in 1802, and the present one in 1877. The draw is too heavy to be handled by hand, and should be replaced by a turn-table draw.

The electric cars now run over the bridge, shooting across the draw with the trolley down, as the upper railroad work is in poor condition and the jar disarranges the machinery; the street-car rails at the draw are not of proper lengths and interfere with the latches, and leave openings where they join the bridge.

The sidewalk, latches, and piers need repairing and the iron draw needs painting, and the railroad work should be put and kept in order.

Neptune-road Bridge (over Boston, Revere Beach, & Lynn R.R.).

This is an iron bridge, built in 1887–88, and is maintained by the Park Department. It is in good condition.

Newton-street Bridge (over Providence Division, N.Y., N.H., & H. R.R.).

This is an iron bridge, built in 1872. It is in good condition, excepting the concrete sidewalks, which should be resurfaced.

North Beacon-street Bridge (from Brighton to Watertown).

The city maintains the part within its limits. This is a wooden pile bridge with a wooden leaf draw. The original structure was built in 1822, and the present one in 1884. A new deck of 4-inch spruce has been put on the bridge. The flooring on the pier is in poor condition, and the sidewalk plank needs renewal. An old unused telephone pole on the bridge should be removed.

North Harvard-street Bridge (from Brighton to Cambridge).

The city maintains the part within its limits. This bridge was originally built in 1662, and was rebuilt in 1879. The draw was rebuilt in 1891. The roadway plank needs renewal, and the tops of some of the piles are decaying; the fence on the bridge needs repairing, and the abutment is in poor condition, to which attention has been called in previous reports.

Prison Point Bridge (from Charlestown to Cambridge).

The city pays one-half of the cost of maintenance. This bridge was originally built in 1833, and the present structure was built in 1876–77. It is a wooden pile bridge, with an iron leaf draw. The bridge is in the care of commissioners, consisting of one commissioner from Boston and one from Cambridge. It is in poor condition. Only ordinary repairs, such as planking and sheathing, have been made on the bridge. The draw is in bad condition and needs a thorough repairing. The question of abolishing the grade crossing on the Boston & Maine Railroad, which adjoins the bridge, is under discussion. If this should be accomplished by carrying the highway over the railroad, it would involve the rebuilding of the bridge. For this reason only such repairs have been made as were absolutely necessary for safety.

Public Garden Foot-bridge.

This is an iron bridge. It was built in 1867, and was thoroughly repaired in 1887. In fair condition except the floor, which needs renewal.

Roxbury Crossing Foot-bridge (over Providence Division, N.Y., N.H., & H. R.R.)

See page 149.

Scarboro' Pond Foot-bridge (in Franklin Park).

This is an elliptical masonry arch of 40 feet span and 8 feet 3 inches rise. The face work is of quarried face Roxbury

stone, and the arch is of brick. It was built in 1893, and is maintained by the Park Department.

Shawmut-avenue Bridge (over Boston & Albany R.R.).

This is an iron bridge, built in 1871. The whole under portion of this bridge needs painting. The report of last year in regard to the unsightly bend in the ornamental parapet caused by the electric-wire pole of the West End Street Railway Company still remains true.

Spring-street Bridge (from West Roxbury to Dedham).

This is a stone bridge. The city maintains the part within its limits. It is in good condition.

Stony-brook Bridge (Back Bay Fens).

This is an ornamental brick arched bridge, with stone facings, built in 1891–92, and maintained by the Park Department. It is in good condition.

Swett-street Bridges (over South Bay Sluices.)

These are wooden bridges, and were built in 1875. They are temporary structures and are in poor condition. The bulkheads that support the adjoining sluices are very much out of shape, and may require repairs at any time. The roadways of these bridges have been kept in safe condition, but as bridges they are of but little value.

Tremont-street Bridge (over Muddy River).

This is a semicircular masonry arch of 15 feet span. The foundation is of concrete, the abutments of granite ashlar backed with concrete. The side walls are of seam-faced granite, and the arch is of brick. It was built in 1893, and is maintained by the Park Departments of Boston and Brookline.

Warren Bridge (from Boston to Charlestown).

This is a wooden pile bridge, with a double retractile iron draw. The present structure was built in 1883–84. The sidewalk on the down-stream side and at the entrance to Fitchburg Railroad yard, the fender-guard, the draw-piers, the deck of the draw and the block-stone pavements are in poor condition. The top and sides of the draw have been painted, and ordinary repairs have been made.

West Boston Bridge (from Boston to Cambridge).

This bridge is in the care of two commissioners, one from Boston and one from Cambridge. The city pays one-half of the cost of maintenance. This is a wooden pile bridge, with a wooden turn-table draw. The bridge was originally built in 1792–93, was rebuilt in 1854, and repaired in 1871. This is an old, weak bridge, and is in an unsafe condition. This bridge, and Canal and Prison Point bridges, are in the care of the same commission, and are kept in usable condition only by constant care. Three bents of piles on the Cambridge side of the draw have been strengthened by driving twelve oak piles and capping and bracing the bents, and the ordinary repairs have been made.

West Fourth-street Bridge (over Old Colony Division, N. Y., N.H., & H. R.R.).

In 1893–94 the grade crossing of the Old Colony Railroad on this street was abolished and an iron bridge built, extending from the end of Dover-street bridge at the South Boston side of Fort Point channel to the easterly line of Foundry street. The bridge consists of six spans resting on masonry piers; each span has three pony trusses, spaced 21 feet 6 inches on centres, dividing the bridge into two roadways 18 feet 6 inches wide in the clear and two sidewalks each 10 feet wide. The entire wearing-surface of the bridge, sidewalks as well as roadways, is covered with spruce plank; that on the roadway was renewed in October, 1895, although the bridge had been opened to travel but ten months. The expense of maintaining this wearing-surface, under the act abolishing grade crossings, devolves upon the city of Boston.

West Rutland-square Foot-bridge (over Providence Division, N. Y., N.H., & H. R.R.).

This is an iron foot-bridge, built in 1882. The stair-treads are badly worn and should be renewed. The sidewalks in Rutland square at the foot of the stairs are too low and should be regraded.

Western-avenue Bridge (from Brighton to Cambridge).

The city maintains the part within its limits. The present bridge was built in 1879–80, and the draw in 1891. The deck of the bridge, sidewalk, and fence are in a poor condition. The floor beams at the rear of the draw-arms should be screw-bolted to the girder-caps, the tops of a few piles are

rotten, the fender-guard and water-way need repairs, the draw-pier is too short and out of repair.

Western-avenue Bridge (from Brighton to Watertown).

The city maintains the part within its limits. This is a wooden pile bridge, with an iron draw, and was rebuilt in 1892–93. It should be painted.

Winthrop Bridge (from Breed's Island to Winthrop).

This is a pile bridge, without a draw. It was originally built in 1839, it was rebuilt in 1851, and was extensively repaired in 1870. The sidewalk, which was damaged by ice early in the year, will be repaired as soon as the weather permits.

BRIDGES WHOLLY SUPPORTED BY RAILROADS.

The bridges over the Boston & Albany Railroad maintained by that company are in a good or fair condition, and require no special report, with the exception of the Washington-street bridge. In the report of last year, attention was called to the impossibility of making a reasonable estimate of the strength of the girders supporting the sidewalks of this bridge. During the past year, the corrosion of the iron has continued and more of the web has disappeared. Unless the railroad company rebuilds this portion of the bridge at once, as recommended last year, it would seem that the safety of those who are obliged to use this bridge demands that the floor be taken up, and a thorough examination made, with a view to devising some means of strengthening these sidewalks, as it cannot be considered at present in a perfectly safe condition.

The Norfolk-street bridge, over the New England Railroad, near Dorchester Station, is a narrow bridge in poor condition, and the wood-work of Adams-street bridge, over the N.Y., N.H., & H. R.R., should be repaired.

SURVEYING DIVISION.

The Surveying Department was consolidated with the Engineering Department, July 1, 1895 (chapter 449 of the Acts of the Legislature), and the Street Commissioners were, with the approval of His Honor the Mayor, appointed in charge of the new division of the Engineering Department.

Soon after the consolidation of the department the City Hall office of the Surveying Division was taken by the Water

Department, and the plans, 22,000 in number, together with all the note books, instruments, supplies, tables, desks, etc., were moved from the City Hall to Room 24 in the Old Court House. The "Dorchester branch office," so called, was also moved from Rooms 20 and 21 to Room 23 in the Old Court House, and the plans and note books were so arranged that they are easy of access. This work required considerable time and care, but now that the main force of the Surveying Division is located in connecting rooms on one floor the arrangement is found to be much more convenient and satisfactory.

The custom of copying all official plans and binding them into volumes, which had been the practice since the City Surveyor's office was established, was changed July 1, and since then all official plans have been made on tracing-cloth, copies being directly obtained by blue printing, thus saving considerable time and expense.

The boundary line between Boston and Brookline was changed by chapter 242 of the Acts of 1894, amended by chapter 485 of the Acts of 1894. It was necessary to carefully survey the line, commencing at Commonwealth avenue near Naples road and ending at a point near the Newton Circuit Division of the Boston & Albany Railroad, south of Reservoir lane, a distance of $2\frac{65}{100}$ miles; this work was done during the month of October; some forty monuments were set in their proper places in the new line, and an accurate description made.

Maps of the new wards as established under an ordinance of the City Council, approved by the Mayor, April 30, 1895, showing precinct lines as established under an order of the Board of Aldermen, dated July 1, 1895, are being prepared for the Printing Department. Also a set of maps on a large scale, showing new wards and precincts, is being prepared for the Board of Election Commissioners.

The great amount of work accomplished during the summer months in giving lines and grades on the avenues recently extended, relocated, widened, etc., by the Board of Street Commissioners, Columbus avenue, Huntington avenue, Blue Hill avenue, Commonwealth avenue, and Brighton avenue, not only for the Sewer and other City Departments, but to enable abutters to move their houses and fences back to the new lines, kept the several surveying parties steadily employed. More lines and grades have been given by the department during 1895 than in any other year since the great fire of 1872.

The work of the grade department was largely increased the past year on account of the demands of builders for

grades on the new lines of these great avenues, many of the buildings having been either sent back to the new street-lines or moved to new situations.

The Sewer Division makes numerous requests for systems of catch-basins to be devised for the streets on which they are drawing plans for new sewers, and frequently the Paving Division asks for the location of additional catch-basins where this department is called upon to make an examination and give approval as to location, requiring an inspection of the street and of the grade plans before the location of the catch-basins can be decided upon.

Many of the assessment plans for sidewalk construction are made during the winter months when there are few orders for outside work. This also applies to the work on plans where construction of streets has been ordered by the Board of Street Commissioners under chapter 323 of the Acts of 1891 and amendments thereto.

Considerable progress has been made on the plans for the revision of grades of streets intersected by the new boulevards, the grades of nearly all the cross-streets being slightly different from the grades established for these avenues, and it consequently becomes necessary to establish new grades for these streets.

Considerable time is devoted to the examination of plans and profiles of private ways submitted by property-owners to the Board of Street Commissioners for their approval, and the grades are examined and frequently revised.

Architects and builders apply for the grade of streets upon which they are to construct buildings; the grade being used by them for drawing plans. To obtain this information often takes considerable time in looking up data from old records and plans.

During the year many public buildings have been staked out for contractors working under the Public Buildings department, additions have been made to many of the lot plans on file in that office, plans and copies of plans have been prepared for the Law Department, etc., etc., and quite an amount of miscellaneous work has been attended to that cannot be classified under any particular head.

The following list gives the number of orders attended to for property-owners and builders and the various city departments, from July 1, 1895, to February 1, 1896:

Street lines given	452
Street grades given	389
Street Department, Paving Division . . .	793
Street Department, Sewer Division . . .	185

Buildings Department[1]	3,020
Public Buildings Department	44
Public Grounds Department	11
Police Department	6
Law Department (accident plans)	40
Street Commissioners, plans for laying out streets, school-house lots, etc.	132
	5,072

The following tables show the amount of paving work measured by the Surveying Division for the years 1894 and 1895, by months:

	Feet of Edgestone.	Sq. Yds. Bl'k Stone Paving and Crossings.	Sq. Yds. R'nd St'ne Paving.	Sq. Yds. Brick Paving.	Sq. Yds. Artificial Stone Walks.	Sq. Yds. Asphalt Paving.	Sq. Yds. Coal Tar Concrete.
1894.							
April	306	142	. . . .	. . . .	. . . .	. . . .	. . . .
May	2,248	466	723	279	. . . .	. . . .	4,145
June	6,752	2,697	2,045	1,830	. . . .	900	. . . .
July	98	29	. . . .	27	157	336	1,312
August	1,545	226	527	558	. . . .	70	907
September	2,245	2,063	56	. . . .	. . . .	. . . .	. . . .
October	2,702	2,710	190	392	619	100	4,675
November	2,633	1,690	728	1,639	180	. . . .	699
December	4,183	1,689	906	1,173	3,006	. . . .	. . . .
1895.							
January	775	295	. . . .	270	. . . .	. . . .	. . . .
Totals	23,487	12,007	5,175	6,168	3,962	1,406	11,738

[1] The greater part of the orders from the Buildings Department are applications for building and repairing permits that are examined daily in relation to street lines and grades, with a view of preventing encroachments over street lines and the erection of buildings at incorrect grades.

	Feet of Edgestone.	Sq. Yds. Bl'k Stone Paving and Crossings.	Sq. Yds. R'nd St'ne Paving.	Sq. Yds. Brick Paving.	Sq. Yds. Artificial Stone Walks.	Sq. Yds. Asphalt Paving.	Sq. Yds. Coal Tar Concrete.
1895.							
April	....	....	....	....	....	282	....
May	5,216	2,600	327	1,589	805	655	....
June	6,791	2,856	1,482	3,348	2,561	257	....
July	8,294	1,968	1,922	2,046	1,451	10	....
August	13,247	4,730	4,667	8,662	1,358	13	183
September	12,360	6,627	5,355	6,110	1,477	12	....
October	25,648	11,640	5,371	15,120	2,651	68	....
November	35,969	20,888	8,512	22,470	1,129	....	....
December	20,692	8,925	4,856	9,045	864	....	....
1896.							
January	1,166	238	448	311	....	....	....
Totals	129,383	60,472	32,940	68,701	12,296	1,297	183

As a matter of record, the following list is given of the work done for the Paving Division of the Street Department, where lines and grades were given and paving work measured during 1895:

EAST BOSTON (INCLUDING BREED'S ISLAND).

Bennington street, from Saratoga street to Walley street. Line and grade given for filling.

Blackinton street, from Walley street to Leyden street. Line and grade given for filling.

Brooks street, between White street and Eutaw street. Edgestone, gutter and sidewalk paving measured.

Byron street, between Saratoga street and Pope street. Line and grade given for sidewalk at No. 67.

Byron street, between Bennington street and Saratoga street. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

East Eagle street, between Putnam street and Prescott street. Edgestone, sidewalk and gutter paving measured.

Eutaw street, between Marion street and Brooks street. Edgestone, sidewalk and gutter paving measured.

Falcon street, between Brooks street and Putnam street. Line and grade for edgestone.

Gladstone street, at and near Walley street. Line and grade given for gutter paving.

Leyden street, at and near Walley street. Gutter paving measured.

Marion street, westerly corner Chelsea street. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

Maverick street, corner of Orleans street. Sidewalk and new crossing measured.

Maverick street, near Cottage street. Line and grade given for edgestone at No. 230.

Meridian street, at Falcon street. Sidewalk and crossing measured.

Monmouth street, between Brooks street and Marion street. Edgestone, gutter and sidewalk paving measured.

Putnam street, between Trenton street and White street. Edgestone, gutter and sidewalk paving measured.

Putnam street, at No. 172. Line and grade for edgestone. Sidewalk paving measured.

Saratoga street, between Putnam street and Prescott street. Edgestone, gutter and sidewalk paving measured.

Saratoga street, between Bennington street and Boston, Revere Beach, & Lynn Railroad. Line for fence. Line and grade for street grading.

Saratoga street, between Moore street and Boston & Albany Railroad. Line and grade for edgestone. Edgestone, gutter and sidewalk paving measured.

Saratoga street, between Moore street and Byron street. Line and grade for edgestone. Edgestone, sidewalk and gutter paving measured.

Saratoga street, between Byron street and Wordsworth street. Gutter paving measured.

Saratoga street, between Chelsea street and Bremen street. Edgestone, gutter and sidewalk paving measured.

Sumner street, at No. 537. Line and grade for edgestone.

Trenton street, between Brooks street and Prescott street. Edgestone, gutter and sidewalk paving measured.

Walley street, between Leyden street and Gladstone street. Gutter paving measured.

West Eagle street, between Border street and Meridian street. Line and grade for edgestone.

West Eagle street, between Meridian street and Brooks street. Edgestone and gutter paving measured.

White street, between Trenton street and Putnam street. Edgestone, gutter and sidewalk paving measured.

CHARLESTOWN.

Albion place. Edgestone, sidewalk and gutter paving measured.

Boyle street. Grade and line for edgestone.

Bunker Hill street, Main street to Sackville street. Edgestone, gutter and sidewalk paving measured.

Chelsea street, Foss street to Chestnut street. Edgestone and sidewalk paving measured.

Chelsea street, Vine street to Scotts court. Edgestone and roadway paving measured.

Essex street, Grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Foss street. Edgestone, sidewalk and gutter paving measured.

Mill street. Sidewalk paving measured.

Mishawum street, Main street to Rutherford avenue. Edgestone, sidewalk and gutter paving measured.

Monument square, High street to Tremont street. Edgestone, sidewalk and gutter paving measured.

School street, Main street to Summer street. Edgestone, sidewalk and gutter paving measured.

Tibbetts Town Way. Grade given and sidewalk paving measured.

Wapping street. Edgestone, sidewalk and gutter paving measured.

Warren street, near Winthrop street. Edgestone and sidewalk paving measured.

Winthrop street, between Wallace court and Warren street. Edgestone, sidewalk and gutter paving measured.

Rutherford avenue, at Mishawum street. Edgestone, sidewalk and roadway paving measured.

SOUTH BOSTON.

Baldwin street, between Granite street and A street. Line and grade given for sidewalk. Edgestone, gutter, roadway, driveway, and sidewalk paving measured.

Bellflower street, at and near Dorchester avenue. Line and grade given for sidewalk.

D street, between West Seventh street and West Eighth street. Line and grade given for sidewalk. Edgestone, gutter, roadway, crossing, and sidewalk paving measured.

Dorchester avenue, at and near Swett street. Edgestone, gutter and sidewalk paving measured.

Dorchester avenue, between West Broadway and Fort Point channel. Roadway paving measured.

East Fifth street, at the north-west corner of H street. Line and grade given for edgestone.

East Second street, between L street and M street. Line and grade given for edgestone at No. 723.

East Third street, between I street and K street. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

F street, between West Seventh street and West Eighth street. Edgestone, gutter and sidewalk paving measured.

H street, between East Second street and East Third street. Line and grade given for sidewalk at Nos. 35, 37, 39.

O street, between East First street and East Second street. Line and grade for sidewalk given and edgestone measured.

Richards street, between Granite street and A street. Line and grade given for sidewalk. Edgestone, gutter, roadway, and sidewalk paving measured.

Boston Proper.

Albany street, at City Hospital. Measurement of asphalt repairs.

Appleton street, at Columbus avenue. Edgestone, sidewalk and gutter paving measured.

Ash street. Measurement of asphalt repairs.

Atlantic avenue, west side, from Broad street to India street. Line and grade given. Edgestone and sidewalk paving measured.

Beacon street, from Arlington street to Clarendon street. Edgestone, sidewalk and gutter paving measured.

Beacon street, from Clarendon street to Dartmouth street. Cross-walk and gutter paving measured.

Beacon street, at No. 224. Measurement of artificial stone sidewalk.

Bendalls Lane. Measurement of sidewalk paving.

Bennett street. Measurement of asphalt repairs.

Bond street. Edgestone and sidewalk paving measured.

Boylston street, northwest side, from Gloucester street to Hereford street. Edgestone, sidewalk and gutter paving measured.

Boylston street, from Massachusetts avenue to Parker street. Line and grade given for resetting edgestone. Edgestone, sidewalk and gutter paving measured.

Bradford street. Edgestone, sidewalk and gutter paving measured.

Brattle street. Asphalt repairs measured.

Bristol street, Nos. 6 to 8. Measurement of roadway repaving.

Buckingham street, from Dartmouth street to Columbus avenue. Edgestone, sidewalk and gutter paving measured.

Burbank street. Edgestone, sidewalk and block-stone roadway paving measured.

Chandler street, at Castle Square Hotel. Sidewalk paving measured.

Chandler street, from Berkeley street to Dartmouth street. Line and grade given to reset edgestone. Edgestone, sidewalk and gutter paving measured.

Clarendon street, north side, from Chandler street to Lawrence street. Edgestone, sidewalk and gutter paving measured.

Clark street. Asphalt repairs measured.

Columbus avenue. Asphalt repairs measured.

Commonwealth avenue, at east corner of Beacon street. Brick sidewalk measured.

Congress street and Congress square. Line and grade for edgestone, and for asphalt block paving, at the Worthington building.

Cooper street. Asphalt repairs measured.

Corning street. Asphalt repairs measured.

Court square. Asphalt repairs measured.

Court street. Asphalt repairs measured.

Dartmouth street, at Commonwealth avenue. Measurement of crossing repaved.

Dartmouth street, at Marlborough street. Measurement of gutter and crossing paving.

Dartmouth street, at Commonwealth avenue. Measurement of gutter and crossing paving.

Dartmouth street, at corner of Huntington avenue. Edgestone, sidewalk and roadway paving measured.

Derne street, at State House. Measurement of sidewalk paving.

Dover street, between Harrison avenue and the bridge. Edgestone, sidewalk and roadway paving measured.

East Canton street, from Washington street to Harrison avenue. Edgestone, gutter and sidewalk paving measured.

East Newton street, Nos. 88 to 98. Edgestone, gutter and sidewalk paving measured.

Endicott street. Measurement of asphalt repairs.

Essex place. Edgestone and block-stone roadway paving measured.

Exchange place. Asphalt repairs measured.

Fairfield street, from Beacon street to Marlborough street. Sidewalk repaving measured.

Falmouth street, at Norway street. Edgestone, gutter and cross-walk paving measured.

Faneuil Hall square, Nos. 54 to 60. Measurement of sidewalk paving.

Federal street, No. 221. Measurement of sidewalk paving.

Hancock street, at State House extension. Measurement of sidewalk paving.

Hanson street, from Tremont street to Shawmut avenue. Edgestone, crossings, gutter and sidewalk paving measured.

Harvard street, from Harrison avenue to Whitmore street. Roadway repaving measured.

Haviland street, at east corner of Turner street. Line and grade given for edgestone, and sidewalk paving measured.

Harrison avenue, near East Concord street. Measurement of asphalt repairs.

Huntington avenue, at east corner of Massachusetts avenue. Measurement of gutter paving.

Irving street, north corner of Myrtle street. Line and grade given for edgestone. Sidewalk paving measured.

Kirkland street, from Pleasant street to Corning street. Measurement of edgestone, crossings, gutter and sidewalk repaving.

Kilby street, at Milk street. Measurement of asphalt repairs.

Lawrence street, at north corner of Clarendon street. Edgestone, gutter and sidewalk paving measured.

Lincoln street, southeast side from Tufts street to Essex street. Line and grade given for edgestone. Edgestone and sidewalk paving measured.

Massachusetts avenue, between Harrison avenue and Albany street. Measurement of edgestone ; gutter and sidewalk repaving measured.

Massachusetts avenue, Nos. 159 to 161. Sidewalk repaving measured.

Milford street, from Tremont street to Shawmut avenue. Edgestone, gutter, crossing, and sidewalk repaving measured.

Mystic street, from East Canton street to Hamburg street. Edgestone, sidewalk and block-stone repaving measured.

Newbury street, between Arlington street and Clarendon street. Edgestone, gutter and sidewalk paving measured.

Newbury street, from Clarendon street to Hereford street. Gutter and cross-walk paving measured.

Newbury street, from Hereford street to Massachusetts avenue. Edgestone, gutter, cross-walk, and sidewalk paving measured.

North street, at No. 6. Measurement of artificial stone sidewalk.

Northampton street, at Watson street. Edgestone, gutter and sidewalk paving measured.

North Bennet street. Measurement of asphalt repairs.

North Margin street. Measurement of asphalt repairs.

Noyes place, from Salem street. Edgestone, sidewalk and block-stone roadway paving measured.

Oak street, from Hudson street to Albany street. Edgestone, sidewalk and roadway paving measured.

Oxford street, from Essex street to Beach street. Edgestone, gutter and sidewalk paving measured.

Parker street, from Boylston street to Westland avenue. Edgestone, gutter and sidewalk paving measured.

Pembroke street, from Warren avenue to Shawmut avenue. Edgestone, gutter, cross-walk, and sidewalk paving measured.

Poplar street. Measurement of asphalt repairs.

Pinckney street, No. 58. Measurement of sidewalk paving.

Ringgold street, from Waltham street to Hanson street. Edgestone, gutter and sidewalk paving measured.

St. Botolph street, Nos. 163 to 187. Edgestone, gutter and sidewalk paving measured.

St. Botolph street, at Follen street. Measurement of cross-walk paving.

St. Charles street, from Chandler street to Boston & Albany Railroad. Edgestone, gutter and sidewalk paving measured.

St. James avenue. Edgestone, gutter and sidewalk paving measured.

St. Stephen street. Edgestone, gutter and sidewalk paving measured.

South Russell street, at west corner of Myrtle street. Line and grade given for edgestone. Edgestone and sidewalk paving measured.

State street, No. 99. Measurement of sidewalk paving.

Thacher street. Measurement of asphalt repairs.

Tileston street. Measurement of asphalt repairs.

Turner street, at Haviland street. Line and grade given for edgestone, and sidewalk paving measured.

Warren avenue, from Berkeley street to Columbus avenue. Line and grade given for edgestone. Edgestone, gutter, cross-walk, and sidewalk paving measured.

Warrenton street. Measurement of asphalt repairs.

Washington street, No. 1050. Edgestone and sidewalk paving measured.

Water street. Measurement of asphalt repairs.

Watson street, westerly side. Edgestone, gutter and sidewalk paving measured.

Wellington street, from Columbus avenue to Carleton street. Edgestone, gutter and sidewalk paving measured.

West Canton street, from Columbus avenue to Carleton street. Edgestone, gutter and sidewalk paving measured.

West Canton street, from Washington street to Appleton street. Edgestone, gutter, cross-walk, and sidewalk paving measured.

Westland avenue, Nos. 65 to 81. Edgestone, gutter and sidewalk paving measured.

Wiggin street. Measurement of asphalt repairs.

Roxbury.

Alaska street. Gutter and sidewalk paving measured.

Amory street, from Stony brook to Amory avenue. Line and grade given for filling.

Arklow street, from Walden street to Gay Head street. Line and grade given for construction of extension.

Aspen street, westerly side, at angle. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Bartlett street, westerly corner of Washington street. Sidewalk paving measured.

Bay State Road, Nos. 7, 9, and 13. Sidewalk paving measured.

Beacon street, corner of Deerfield street. Sidewalk paving measured.

Beacon street, at No. 875. Sidewalk paving measured.

Beacon street, westerly corner of Raleigh street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Beacon street, easterly corner of Commonwealth avenue. Line and grade given for edgestone. Edgestone, gutter, and sidewalk paving measured.

Beacon street, corner of Audubon road. Crossing paving measured.

Beacon street, corner of Mountfort street. Crossing paving measured.

Beacon street, at Audubon circle. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Blue Hill avenue, southwesterly corner of Gaston street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Blue Hill avenue, easterly side, near Dove street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Bower street, at Nos. 113 and 117. Sidewalk paving measured.

Brook avenue, at Nos. 101 and 103. Sidewalk paving measured.

Brunswick street, corner of Warren street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Buena Vista avenue, from Warren street to Fenno street. Edgestone, gutter and sidewalk paving measured.

Burney street, from Tremont street to Delle avenue. Line and grade given for edgestone.

Calumet street, from Tremont street to Hillside street. Line and grade given for resurfacing.

Cobden street, from Washington street to Walnut avenue, south-westerly side. Edgestone, gutter and sidewalk paving measured.

Cobden street, at No. 29. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Cobden street, easterly corner of Washington street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Cobden street, at No. 1. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Crawford street, southwesterly side, from Warren street to Humboldt avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Crawford street, at No. 43. Sidewalk paving measured.

Crawford street, north and west corners of Harold street. Line and grade given for edgestone. Edgestone, gutter, and sidewalk paving measured.

Crawford street, westerly side, near Harold street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Cunard street, north and west corners of Tremont street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Cunard street, southerly corner of Tremont street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Cunard street, from Tremont street to Cabot street. Line and grade given for filling.

Deerfield street, northerly corner of Beacon street. Edgestone, gutter and sidewalk paving measured.

Devon street, at Nos. 5, 9, and 10. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Dudley street, southerly corner of West Cottage street. Sidewalk paving measured.

Dudley street, at Nos. 579 and 583. Sidewalk paving measured.

Eldora street, from Sunset street to Hillside street. Line and grade given for edgestone. Edgestone and gutter paving measured.

Elm Hill avenue, from No. 89 to No. 95. Edgestone, gutter and sidewalk paving measured.

Elm Hill avenue, north side, between Wenonah street and Howland street. Line and grade given for edgestone. Sidewalk paving measured.

Elm Hill avenue, southeast side, between Waumbeck street and Howland street. Sidewalk paving measured.

Elm Hill avenue, northerly corner of Howland street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Fairbury street, north side, from Blue Hill avenue to Rand street. Edgestone, gutter and sidewalk paving measured.

Fenno street, at "church." Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Fenno street, both sides, at and near Rockland street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Francis street, from Binney street to Brookline avenue. Edgestone, gutter and sidewalk paving measured.

Gaston street, at No. 12. Sidewalk paving measured.

Gaston street, south-westerly corner of Warren street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Gaston street, south side, from Blue Hill avenue to angle. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Georgia street, westerly corner of Maple street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Greenville street, from Dudley street to Winthrop street. Edgestone, gutter and sidewalk paving measured.

Greenwich street, crossing paving measured.

Gurney street, northerly corner of Tremont street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Hammett street, corner of Grinnell street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Hammond street, at Nos. 10 to 16. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Hammond street, southerly corner of Cabot street. Sidewalk paving measured.

Harold street, north-westerly side, from Crawford street to Ruthven street. Line and grade given for edgestone.

Harold street, easterly corner of Homestead street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Harold street, south-easterly side, near Ruthven street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Harold street, southerly corner of Ruthven street. Edgestone, gutter and sidewalk paving measured.

Harrison avenue, from No. 879 to No. 885. Sidewalk paving measured.

Harrison avenue, from Zeigler street to Dudley street. Edgestone, gutter and sidewalk paving measured.

Hazelwood street, from Townsend street to Munroe street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Highland street, easterly corner of Thwing street. Sidewalk paving measured.

Hillside street, from Wait street to Parker Hill avenue. Line and grade given for edgestone.

Holborn street, south side, between Blue Hill avenue and Gannett street. Line and grade given for edgestone, and paving measured.

Holborn street, at Nos. 31, 33, and 34. Sidewalk paving measured.

Holworthy street, at Walnut avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Homestead street, north-east side, near Harold street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Homestead street, easterly corner of Harold street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Howard avenue, at No. 5. Sidewalk paving measured.

Howard avenue, at Nos. 113 and 115. Edgestone, gutter and sidewalk paving measured.

Howland street, between Elm Hill avenue and Humboldt avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Howland street, north-east side, near Elm Hill avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Howland street, northeast corner of Elm Hill avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Hulbert street, near Ray street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Humboldt avenue, corner of Townsend street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Hunneman street, west side, between Washington street and Harrison avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Ivy street, in front of new block. Sidewalk paving measured.

Judson street, from West Cottage street to Julian street. Edgestone, gutter and sidewalk paving measured.

Leon street, from Ruggles street, easterly side. Edgestone, gutter and sidewalk paving measured.

Leon street. Line and grade given for edgestone.

Leyland street, from No. 5 to No. 9. Edgestone, gutter and sidewalk paving measured.

Longwood avenue, from Brookline avenue to Riverway. Edgestone, gutter and sidewalk paving measured.

Longwood avenue, westerly corner of Wigglesworth street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Madison street, from Washington street to Shawmut avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Mansur street, corner of Schiller street. Line and grade given for edgestone. Edgestone and gutter paving measured.

Maple street, southerly corner of Wayne street. Sidewalk paving measured.

Maple street, corner Georgia street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Marcella street, easterly side of Highland street. Line and

grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Maywood street, from Warren street to Hazel park. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Maywood street, north side, from Hazel park to angle near Blue Hill avenue. Line and grade given for edgestone. Edgestone and gutter paving measured.

Mill street, westerly corner of Rockland street. Sidewalk paving measured.

Moreland street, westerly corner of Whiting street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Morley street, from Highland street. Edgestone, gutter and sidewalk paving measured.

Munroe street, from No. 64 to No. 70. Sidewalk paving measured.

Munroe street, at Hazelwood street. Gutter and sidewalk paving measured.

Munroe street, at No. 72. Sidewalk paving measured.

Munroe street, at Nos. 77, 79, and 81. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

New Heath street, northerly corner of Columbus avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Norfolk avenue, from Magazine street to East Cottage street. Grade given for resurfacing.

Otisfield street, corner of Gaston street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Ottawa street, westerly corner of Sherman street. Grade given for edgestone. Edgestone and gutter paving measured.

Prescott street, from Hampden to Eustis street. Edgestone, gutter and sidewalk paving measured.

Quincy street, northerly side, from Warren street to Blue Hill avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Raleigh street, westerly corner of Beacon street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Raleigh street, from Bay State road to Charles river. Gutter and cross-walk paving measured.

Ray street, at No. 9. Edgestone, gutter and sidewalk paving measured.

Reed street, south corner of Newcomb street. Line and

grade for edgestone. Edgestone, gutter and sidewalk paving measured.

Regent street, No. 84 to No. 88. Edgestone, gutter and sidewalk paving measured.

Rockland street, at east corner of Walnut avenue. Sidewalk paving measured.

Roxbury street, Nos. 98 and 100. Edgestone, gutter and sidewalk paving measured.

Roxbury street, at south corner of Columbus avenue. Edgestone, gutter and sidewalk paving measured.

Ruthven street, at No. 78. Line and grade given for edgestone, and paving measured.

Ruthven street, at south corner of Harold street. Edgestone, gutter and sidewalk paving measured.

Ruthven street, northerly side, between Harold street and Walnut avenue. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Ruthven street, north-easterly side, near Harold street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Sachem street, westerly side. Gutter paving measured.

Savin street, at Nos. 55, 66, and 68. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Schiller street, at south-west corner of Mansur street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Sheridan street, at Nos. 1 and 3. Edgestone, gutter and sidewalk paving measured.

Shirley street, from George street to Norfolk avenue. Line and grade given for grading street.

Shirley street, from Dudley street to No. 25. Sidewalk paving measured.

Simmons street. Sidewalk paving measured.

Sterling street, between Shawmut avenue and Westminster street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Sterling street, from Washington street to Shawmut avenue. Line and grade given for edgestone.

Sunset street, from Hillside street to Parker Hill avenue. Line and grade given for gutters. Gutter paving measured.

Swett street, at Massachusetts avenue. Roadway paving measured.

Taber street, No. 33 to No. 37. Sidewalk paving measured.

Thorndike street, south-west side. Reed street to Harrison

avenue. Line and grade given for edgestone. Edgestone and sidewalk paving measured.

Thwing street, at westerly end. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Townsend street, from Harold street to Warren street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Tremont street, at Sewall street. Gutter paving measured.

Tremont street, south-east side, from Hammond street to Kendall street. Edgestone, sidewalk and roadway paving measured.

Tremont street, north-west side, from Walpole street to Coventry street. Edgestone and roadway paving measured.

Tremont street, at northerly, southerly, and westerly corners of Cunard street. Lines and grade given for edgestone. Edgestone and sidewalk paving measured.

Vernon street, between Cabot street and Haskins street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Vine street, between Dudley street and Mt. Pleasant avenue. Edgestone, gutter and sidewalk paving measured.

Walnut avenue, at easterly corner of Ruthven street. Edgestone, gutter and sidewalk paving measured.

Walnut avenue, at Nos. 332 and 354. Sidewalk paving measured.

Walnut avenue, at No. 367. Edgestone, gutter and sidewalk paving measured.

Walnut avenue, west corner of Cobden street. Edgestone, gutter and sidewalk paving measured.

Walnut avenue, at Nos. 76 and 78. Sidewalk paving measured.

Walnut avenue, near Walnut park. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Warren street, at No. 130. Sidewalk paving measured.

Warren street, at Brunswick street. Edgestone, gutter and sidewalk paving measured.

Warren street, at north-west corner of Washington street. Line and grade given for edgestone. Edgestone, sidewalk and roadway paving measured.

Warren street, between Lansing street and Walnut avenue. Cross-walk paving measured.

Washington street, between Bartlett street and Guild street. Line and grade given for edgestone. Edgestone, sidewalk and roadway paving measured.

Washington street, at No. 3638. Sidewalk paving measured.

Washington street, at south corner of Warren street. Line and grade for edgestone.

Washington street, south-east side, near Elmore street. Line and grade given for edgestone. Edgestone and sidewalk paving measured.

Waumbeck street, at south corner of Humboldt avenue. Edgestone, gutter and sidewalk paving measured.

Wayne street, at southerly corner of Maple street. Sidewalk paving measured.

Westminster street, at Marble street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Weston street, between Tremont street and Cabot street. Edgestone, gutter and sidewalk paving measured.

Whiting street, at west corner of Moreland street. Line and grade given for edgestone. Edgestone and gutter paving measured.

Wigglesworth street, at west corner of Longwood avenue. Line and grade given for edgestone. Edgestone and gutter paving measured.

Williams street, between Shawmut avenue and Westminster street. Edgestone, gutter and sidewalk paving measured.

Winthrop street, east side, near Dennis street. Line and grade given for edgestone. Edgestone, gutter and sidewalk paving measured.

Woodbine street, from Warren street to Blue Hill avenue. Edgestone, gutter and sidewalk paving measured.

Dorchester.

Adams street, from Minot street to Frederika street. Line and grade given for edgestone. Edgestone and gutter paving measured.

Adams street, at Lonsdale street. Line given for edgestone.

Adams street, easterly side, from Minot street to Marsh street. Line and grade given for edgestone.

Alban street, from Welles avenue to Ashmont street. Line and grade given for edgestone.

Algonquin street. Line and grade given for edgestone at Nos. 38, 40, 42.

Algonquin street and Bradlee street. Line and grade for setting park stone near Washington street.

Algonquin street, north side, from Harvard street to No. 39. Line and grade given for edgestone.

Algonquin street. Line and grade given for sidewalk at No. 35.

Allston street, at Kenwood street. Line and grade given for edgestone.

Auckland street, east side, corner of Savin Hill avenue. Line and grade given for edgestone.

Bicknell street, from Harvard street to Bradshaw street. Line and grade given for sidewalks. Gutter and sidewalk paving measured.

Blue Hill avenue. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured at No. 274.

Bowdoin avenue. Line and grade given for edgestone at No. 75. Edgestone and gutter paving measured.

Bowdoin avenue. Line and grade given for edgestone at Nos. 71, 73, and measurement of artificial stone sidewalk at No. 71.

Bowdoin avenue. Line given for edgestone.

Bowdoin avenue and Washington street. Line and grade given for edgestone.

Bowdoin street. Line and grade given for sidewalk at No. 78.

Bradlee street. Line and grade given for sidewalk at No. 33.

Bradlee street. Sidewalk measured at No. 37.

Brent street, north side, between Talbot avenue and Carlisle street. Grade given for resetting edgestone.

Church street, Winter street to High street. Line and grade given for edgestone.

Clapp street. Line and grade given for edgestone, at Nos. 44 to 58.

Cushing avenue, at angle. Line and grade given for sidewalk, and same measured.

Cushing avenue, south side, near the church. Line and grade given for sidewalk.

Dewey street. Line and grade given for sidewalk at Nos. 45 to 49. Edgestone, gutter and sidewalk paving measured.

Dewey street, south side, near Howard avenue. Line and grade given for edgestone.

Glenway street. Line and grade given for sidewalk. Gutter and sidewalk paving measured.

Greenwich street, north side, near Freeport street. Line and grade given for edgestone.

Hartford street. Sidewalk paving measured.

Harvard street, north side, between Waterlow street and New England Railroad. Line and grade given for sidewalk. Edgestone and gutter paving measured.

Harvard street, from No. 77 to Sydney place. Line and

grade given for sidewalk, and artificial stone sidewalk measured.

Howard avenue. Line and grade given for edgestone at No. 124.

Howard avenue. Line and grade given for edgestone at Nos. 116–120.

Judson street. Line and grade for macadamizing.

Judson street. Line and grade given for edgestone at No. 28.

Kenwood street. Line and grade given for sidewalk. Edgestone and gutter paving measured.

Kenwood street, at the corner of Allston street. Line and grade given for corner circles.

Leyland street. Line and grade given for edgestone at Nos. 5 and 7.

Marshfield street, Clifton street to Norfolk avenue. Line and grade given for edgestone.

Mayfield street, between Pleasant street and Bakersfield street. Line and grade given for sidewalk.

Melville avenue, from Dorchester avenue to Shawmut Branch Railroad. Line and grade for macadamizing.

McLellan street. Line and grade given for edgestone.

Mt. Vernon street, at the corner of Buttonwood street. Line and grade given for edgestone.

Mt. Vernon avenue. Line and grade given for edgestone.

Oakland street, from River street to New England Railroad. Line and grade given for filling.

Ocean street. Sidewalk paving measured.

Quincy street, from Blue Hill avenue to Harvard street. Line and grade given for macadamizing.

River street, south side, near Blue Hill avenue. Line and grade given for edgestone.

Romsey street. Line and grade given for sidewalk at No. 7.

Sagamore street, Higgins estate. Line and grade given for sidewalk.

Salcombe street, at Stoughton street. Line and grade given for edgestone.

Sydney street. Line and grade given for sidewalk at No. 4.

Sydney street. Line and grade given for sidewalk at No. 169, and sidewalk measured.

Talbot avenue, from Washington street to Welles avenue. Line and grade given for edgestone. Edgestone and gutter paving measured.

Waldeck street, Park street to Tremlett park. Line and grade given, for owners to build street.

Walnut street, from New York, New Haven, & Hartford Railroad to Ericsson street. Line and grade given for edgestone.

Walton street, south side, near Harley street. Line and grade given for sidewalk.

Washington street, south of Dunbar avenue. Line and grade given for edgestone and railroad track.

Washington street. Line and grade given for sidewalk at No. 424, and sidewalk paving measured.

Washington street, west side, south of New England Railroad. Line and grade given for edgestone.

Washington street. Line and grade given for edgestone at No. 394, and same measured.

Washington street, south side, near Harvard street. Line and grade given for edgestone, and artificial stone sidewalk measured.

Washington street and Wilder street, north-west corner. Line and grade given for sidewalk.

Welles avenue, between Ocean street and Talbot avenue. Line and grade given for sidewalk, and gutter paving measured.

BRIGHTON.

Cambridge street, at Charles river. Line and grade given for sidewalk. Edgestone and gutter paving measured.

Fairbanks street, from Washington street to Faneuil street. Lines and grades given for construction, and gutter paving measured.

Gardner street, between Harvard avenue and Malvern street. Lines and grades given for artificial stone sidewalks, and same measured.

North Harvard street, at Western avenue. Line and grade given for sidewakl and road construction. Edgestone, gutter and sidewalk paving measured.

Pomeroy street, between Gordon street and Saunders street. Line and grade given for sidewalk. Edgestone and gutter paving measured.

Summit avenue, between Allston and Summer streets. Line and grade given for grading.

Sutherland street, between Beacon street and Commonwealth avenue. Lines and grades given for gutter paving, and same measured.

Washington street, from Cambridge street to Oak square. Lines and grades given for construction on lines of relocation. Edgestone, gutter and sidewalk paving measured.

Winship street, between Chestnut Hill avenue and Washington street. Line given. Edgestone and gutter paving measured.

Western avenue, at North Harvard street. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

West Roxbury.

Bellevue street, from Centre street to Oriole street. Line and grade given for construction, and gutter paving measured.

Boylston street, at Lamartine street. Line and grade given for construction on line of widening. Edgestone, crosswalk, gutter and sidewalk paving measured.

Boylston street, between Germania street and angle. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

Brookside avenue, at and near Green street. Line and grade given for sidewalk. Edgestone and gutter paving measured.

Catherine street, from Florence street to Bourne street. Line and grade given for construction.

Centre street, at the corner of Hastings street. Line and grade given for sidewalk. Edgestone and gutter paving measured.

Centre street, at and near Green street. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

Danforth street, between Boylston street and Wyman street. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

Green street, between Brookside avenue and Boylston avenue. Line and grade given for construction on revised grade. Edgestone, gutter and sidewalk paving measured.

Hewlett street, from Walter street to Selwyn street. Line and grade given for construction.

Hyde Park avenue, at Walk Hill street. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

Maple street, from Centre street to Weld street. Line given for gutter, and same measured.

March avenue, between Park street and Bellevue street. Line and grade given for sidewalk, and gutter paving measured.

Paul Gore street, between Centre street and Chestnut avenue. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

Perkins street, at Jamaica Way. Line and grade given. Edgestone and gutter paving measured.

Pond street, at the corner of Avon street. Line given. Edgestone and gutter paving measured.

Poplar street, at Washington street. Line and grade given for sidewalk. Edgestone and gutter paving measured.

Ridge street, between Sherwood street and Sycamore street. Line and grade given for paving gutters, and same measured.

St. John street, between Centre street and Rockview street. Line and grade given for construction. Edgestone and gutter paving measured.

Seaverns avenue, at Elm street. Line given for rebuilding retaining-wall.

South Fairview street, between South street and South Walter street. Line and grade given for construction.

South Walter street, between South street and South Fairview street. Line and grade given for construction.

South street, from Washington street to South Walter street. Line and grade given for construction. Edgestone and gutter paving measured.

Sycamore street, between Ashland street and Ridge street. Line and grade given for paving gutters, and same measured.

Walk Hill street, at Hyde Park avenue. Line and grade given for sidewalk. Edgestone, gutter and sidewalk paving measured.

Washington street. Line and grade given for sidewalk at No. 3638. Edgestone and artificial stone sidewalk measured.

Washington street, at Peter Parley street. Line and grade given. Edgestone and gutter paving measured.

Washington street. Line and grade given for sidewalk at No. 3175. Edgestone and artificial stone sidewalk measured.

Wren street, from Rutledge street to Oriole street. Line and grade given for construction, and gutter paving measured.

PLANS

IN SURVEYING DIVISION, ENGINEERING DEPARTMENT, JANUARY 31, 1896.

Indexed.	General Head under which Classified.	Number of Plans.
Vol. A.	Plans of estates (lithographed)	221
" B.	" " " "	187
" C.	" " " " in Brighton	31
" D.	" " " " in West Roxbury	53
" E.	" " " "	17
" F.	" " " "	2
" 1 to 13[1]	" " " widenings, etc.	664
" { 14, 15, 16, and 17 } .	" " "	505
" 18	School-house and miscellaneous plans	95
" 19	Plans from actual survey in City Proper	130
" 20	Profiles of City Proper and Boston Harbor, and ancient plans	91
" 21	Plans and profiles of streets in East Boston, 1849	45
" 22	" " " " " " " " 1868	45
" 23	" " " " " " South Boston, 1848	27
" 24	" " " " " " " " 1860	39
" 25	" " " " " at South End	21
" 26	" " " " " in Church and Suffolk st. Dists.,	38
" 27	" " " " various streets	16
" 28	" " " " streets at South End	15
" 29	Miscellaneous plans, estates, etc.	69
" 30	" " " "	97
" 31	Official plans from 1851 to 1854	103
" 32	Plans of estates	112
" 33	" " "	131
" 34	" " "	108
" 35	" " "	256
" 36	" " "	118
" 38 } " 39 }	Hale's plans of the streets in Boston, 1819	176
" 40	Plans of estates	66
" 41	" " "	494
" 42	Ancient plans of estates in South Boston, etc.	46
" 43	Sectional plans of city lands at South End	24
" 44	Plans of estates in Roxbury	77
	Carried forward	4,119

[1] Vol. 8 is a set of Architects' plans, and has been transferred to the Public Buildings Department.

PLANS

IN SURVEYING DIVISION, ENGINEERING DEPARTMENT, JANUARY 31, 1896. — *Continued.*

Indexed.	General Head under which Classified.	Number of Plans.
	Brought forward	4,119
Vol. 45	Plans of estates in Roxbury	70
" 46	" " " " "	80
" 47	" " widenings in Roxbury	50
" 48	" " " etc., in Roxbury	140
" 49	" " " " " "	73
" 50	Third Parish and Grammar School lands in Roxbury	57
" 51	Plans of widenings in Roxbury	59
" 52	" " city lands and widenings in Roxbury	92
" 53	Profiles of streets in Roxbury	76
" 54	" " " " "	87
" 55	" " " " "	42
" 56	" " " " "	56
" 57	Plans of widenings in Brighton	25
" 58	" " estates in Brighton	115
" 59	" " " " "	74
" 60	" " city property, etc., in Brighton	18
" 61	" " widenings in West Roxbury	75
" 62	" " " " " "	44
" 63	Profiles of streets	58
" 64	Plans of city property, etc., in West Roxbury	27
" 65	" " estates, etc., in West Roxbury	199
" 66	" " " " " " "	217
" 67	" " " " " " "	73
" 68	" " " " " " " and Brighton	152
" 69	" " " "	140
" 70	" " " "	183
" 71 to 82	Charlestown plans, in bound volumes, showing street-widenings and estates	626
" 83	Charlestown street surveys	229
" 84	Miscellaneous plans	106
" 85	Plans of estates in Roxbury	485
" 86	" " " " "	18
" 87	" " " etc.	169
" 88	" " " "	32
	Carried forward	8,066

PLANS

IN SURVEYING DIVISION, ENGINEERING DEPARTMENT, JANUARY 31, 1896. — *Continued.*

Indexed.	General Head under which Classified.	Number of Plans.
	Brought forward	8,066
Vol. 89	Plans of estates, etc.	140
" 90	" " " "	10
" 91	Insurance volumes	25
" 92	" "	31
" 93	" "	28
" 94	" "	27
" 95	Dorchester surveys	65
" 96	" "	61
" 97	" "	63
" 98	Plans of estates, etc.	99
" 99	" " " in Dorchester	322
In Drawer A	Plan of Boston from 1777 to 1891	39
" Cases CC	Miscellaneous rolled plans	670
" Drawer E	Plans from surveys in City Proper	503
" " F	Plans and profiles from surveys in City Proper and Roxbury	627
" " G	South Boston plans and profiles	330
" " H	East Boston plans and profiles	129
" " L	Official plans, profiles, etc.	2,782
" " M	Copies of plans by other surveyors	321
" " N	Plans of city lands	201
	4 vols. tracings of plans and profiles	632
In Drawers	" " " "	595
Vol. I. to LXIV.	Copies of official plans indexed in Vol. 31 and Drawer L	2,632
	Other plans in bound volumes	1,450
	Miscellaneous plans of the Back Bay Commission in portfolio	15
	Hanging plans	23
	Rolled plans not indexed	25
	Plans in progress, City Proper	78
	" " " South Boston	61
	" " " East Boston	41
	" " " Roxbury	88
	" " " Dorchester	122
	" " " West Roxbury	98
	Carried forward	20,399

PLANS

IN SURVEYING DIVISION, ENGINEERING DEPARTMENT, JANUARY 31, 1896. — *Concluded.*

Indexed.	General Head under which Classified.	Number of Plans.
	Brought forward	20,399
	Plans in progress, Brighton	75
	" " " Charlestown	17
	South Boston sectional plans	42
	East Boston " "	54
	Roxbury " "	163
	West Roxbury " "	83
	Sectional plans filed by Board of Survey	237
	Plans filed by the Boston Transit Commission	5
	15 vols. copies of Assessors' plans	1,579
	Indexed plans of Dorchester	2,412
	Sectional plans "	232
	Miscellaneous plots and plans of Dorchester	516
	Plans of proposed streets submitted by owners and approved by the Board of Street Commissioners:	
	East Boston	10
	Roxbury	29
	Dorchester	107
	Charlestown	1
	West Roxbury	53
	Brighton	31
	Plans of proposed streets submitted by owners for the approval of the Board of Street Commissioners now under consideration:	
	Roxbury	17
	Dorchester	54
	West Roxbury	25
	Brighton	10
		26,151

There are also 4,004 lithographed plans in the office at Old Court House not included in the foregoing list, viz.:

Lithographed maps of Dorchester, made in 1869	39
" " " " " " 1880	163
" " " West Roxbury, made in 1873	43
" " " Brighton, made in 1873	19
" " " Fort Hill, made in 1866–69	106
" " " Church-st. district, made in 1868	189

Lithographed maps of Washington-st. widening (parts 1, 2, 3), made in 1860			1,105
"	"	" Washington-st. extension, made in 1869	170
"	"	" North street, made in 1859	44
"	"	" Stony brook, drainage area	11
"	"	" Boston, made in 1866–67	111
"	"	" Boston, made in 1888	158
"	"	" Suffolk-st. district, made in 1869	20
"	"	" South Boston, made in 1880	85
"	"	" Roxbury, made in 1880	119
"	"	" Charlestown, made in 1890	11
"	"	" Burnt district	77
"	"	" Mt. Hope Cemetery	29
"	"	" Winthrop Farm	51
"	"	" Hanover avenue	43
"	"	" Muddy river	44
"	"	" Pemberton square, Court House site	243
"	"	" East Newton street, lots on, sold by auction, made in 1888	44
"	"	" Public lands in South Boston, sold by auction, made in 1885	84
"	"	" Public lands in South Boston, sold by auction, made in 1888	10
"	"	" Boylston street, old Public Library lot	17
"	"	" Public lands in South Boston, sold by auction, made in 1882	142
"	"	" Boston, Directory map, made in 1886	96
"	"	" Boston, scale 1,600 feet to an inch, made in 1890,	353
"	"	" Boston, scale 800 feet to an inch, made in 1891, colored plans	13
"	"	" Boston proper, scale 500 feet to an inch, made in 1894	16
"	"	" Exhibit No. 1, City Surveyor's Report, 1893	106
"	"	" Exhibit No. 2, City Surveyor's Report, 1893	126
"	"	" High street, public lands sold by auction	16
"	"	" Beacon Hill, State House site	44
"	"	" Harrison avenue, Savage School-house lot, auction plan	57
			4,004

The plan on opposite page was prepared under the direction of the former City Surveyor, Mr. Pierre Humbert, Jr., and shows the changes in street and wharf lines in the city proper for the hundred years from 1795 to 1895.

B.

[FROM THE CITY ENGINEER'S REPORT TO THE WATER COMMISSIONER.]

SOURCES OF SUPPLY.

The rainfall during the year 1895 was above the average in amount, and the supply of water has been ample at all times.

The rainfall and quantities collected on the several watersheds were as follows:

	Sudbury.	Cochituate.	Mystic.
Rainfall, in inches	50.62	48.96	48.73
Rainfall collected, in inches	24.196	20.172	17.426
Daily average yield of watershed, in gallons	86,632,900	18,125,934	22,300,000

An unusually large fall of rain occurred October 12–14, 1895; beginning at 1.30 P.M. on Saturday, October 12, the rain was continuous and uniform until 4.15 A.M. of Monday, October 14, 1895. During that time — less than thirty-nine hours — 7.5 inches of rain fell.

Reservoir No. 1.

Grades, H.W., 161.00; Tops of Flash-boards, 159.29 and 158.41; Crest of Dam, 157.54. Area, Water Surface, 143 acres; Greatest Depth, 14 ft.; Contents below 161.00, 376,900,000 gals.; Below 159.29, 288,400,000 gals.

The surface of this reservoir was about one foot below the crest of the dam on January 1, 1895. Waste began January 13 and continued until February 2, and no more waste occurred until March 12.

From March 12 to May 9 water was wasted over the dam, and on May 9 the flash-boards were placed in position. On May 22 the reservoir was full, and waste began over the flash-boards, lasting until May 28. From June 5 to June 9 water was wasted over the flash-boards. The flash-boards were removed on October 16, and waste occurred from October 16 to January 1, 1896. The dam is in good condition.

Reservoir No. 2.

Grades, H.W., 168.00; Tops of Flash-boards, 167.12 and 166.49; Crest of Dam, 165.87. Area, Water Surface, 134 acres; Greatest Depth, 17 ft.; Contents Below 168.00, 568,300,000 gals.; Below 167.12, 529,860,000 gals.

On January 1, 1895, water was wasting over the dam. From January 3 to 13 there was no waste. Beginning on the 13th, water was wasted until February 10. Waste occurred from March 11 until May 9, when the flash-boards were placed upon the dam. On April 8 the reservoir was drawn upon for the supply of the city. During July, August, September, and part of October, water was run into the reservoir from Reservoirs 4 and 6. The flash-boards were removed from the dam on November 6. Waste occurred on that day, and continued during the remainder of the year. The dam is in good condition.

Reservoir No. 3.

Grades, H.W., 177.00; Crest of Dam (no Flash-boards), 175.24. Area at 177.00, 253 acres; Contents below 177.00, 1,224,500,000 gallons. Area at 175.24, 248 acres; Contents below 175.24, 1,081,500,000 gallons. Greatest Depth, 21 ft.

On January 1, 1895, this reservoir was full. On January 11 waste began, and continued until February 7. Waste also occurred from March 10 to May 7. On July 25 the surface of reservoir was 5.25 feet below crest of the dam. Filling slowly from that time, the water surface reached the crest of the dam on October 16. From October 16 to January 1, 1896, water has wasted over the dam, excepting October 29 and November 16. The dam is in good condition.

Reservoir No. 4.

Grades, H.W., 215.21; Tops of Flash-boards, 215.21+and 214.89; Crest of Dam, 214.23. Area, Water Surface, 167 acres; Greatest Depth, 49 ft.; Contents below 215.21, 1,416,400,000 gallons.

On January 1, 1895, the surface of water in the reservoir was 18.05 feet below the crest of the dam. The reservoir filled gradually, and on April 9 waste began, and continued until May 9, when one set of flash-boards was placed upon the dam. Water wasted over the first set of flash-boards from May 14 to May 23, when the second set of flash-boards was added. Waste occurred over the second set from May 28 to June 19 and from June 28 to July 4. On July 3 the reservoir was drawn upon for the supply of the city, and on October 12 the water surface had fallen 22.45 feet below the crest of the dam. Since October 12 it has been gradually filling. The dam is in good condition.

Reservoir No. 5.

Work for the year was commenced on April 13, and has been prosecuted throughout the year. The following report of Desmond FitzGerald, Resident Engineer, gives further information in regard to the work on this reservoir, as well as other matters connected with additional supply:

SOUTHBOROUGH, MASS., January 1, 1896.

WILLIAM JACKSON, ESQ., *City Engineer:*

DEAR SIR: Herewith please find report of work accomplished by additional supply force under my direction during the past year. The grounds adjoining the embankment of Dam No. 6 have been cleared of waste material, graded, and top-dressed with loam. The filter beds are now under construction; one bed has been entirely completed and underdrained, and the second bed has been graded and is ready for the drains.

Stone bounds have been set at the angles of all the pieces of land owned by the city at Basin No. 6. At Dam No. 5 work was begun on April 13, and continued at a satisfactory rate during the year. The following grades indicate in a general way the progress made:

Masonry section from grade 190 to grade 217.

Earth embankment at northerly end of dam from grade 203 to grade 210.

Earth embankment at southerly end of dam from grade 220 to grade 224.

The core wall at northerly end of dam is completed to grade 211, and at the southerly end to grade 225.

The northerly wing wall is completed to grade 217, and the southerly one to grade 225.

The quantities of materials handled during the year on the dam are as follows:

Soil moved	1,409 cubic yards.
Soil placed on dam	776 " "
Earth excavation	61,109 " "
Rock excavation	2,154 " "
Concrete masonry	3,825 " "
Rubble masonry	15,812 " "
Range work	2,281 " "
Plastering	1,657 square "

In connection with the reservoir the work of stripping on

Section A was continued until September. The completion of this section must await the removal of the injunction which now holds against carrying on work. Early in the year plans and specifications were prepared for letting two portions of the new Framingham-Marlboro' road, comprising about 2¾ miles in length.

This work was let in April and completed during the year.

In February and March plans and specifications were prepared for the stripping and shallow flowage connected with the Stony-brook branch of the basin. This work was let in April and is now well under way. The following quantities of materials have been moved in connection with the stripping:

Earth excavation	698,654	cubic yards.
Split stone masonry	2,048	" "
Paving in mortar	369	" "
Concrete masonry	740	" "
Rubble masonry	811	" "
Dry paving	730	" "
Rip-rap	2,784	" "
Stone wall	71	rods.

The contract for building 20,000 linear feet of iron fence was made in July, and under this contract 2,300 feet have been constructed. The lands owned by the city and the road lines have been marked by stone bounds. In April a contract was made for grading a series of 20 filter beds near Marlboro' Junction. This work has been completed and the final estimate is now under way. Besides the above work, a number of plans and estimates have been made for an extension of the work on this basin.

Respectfully submitted,

(Signed) DESMOND FITZGERALD,
Resident Engineer.

Reservoir No. 6.

Grades, H.W., 295.00; Top of Flash-boards, 295.00; Crest of Dam, 294.00. Estimated Area, 185 acres; Estimated Contents, 1,530,300,000 gals.

The surface of the reservoir was 15.16 feet below the crest of the dam on January 1, 1895. Filling gradually, water began to waste over the dam on April 5, and continued until May 9, when the first set of flash-boards was placed upon the dam. On May 19 water wasted over the flash-boards, and continued until May 23.

The second set was placed upon the dam on May 23, and waste occurred over this set from May 23 to June 17. On

October 13 the water surface reached its lowest point, being 21.74 feet below the crest of the dam. During November and December it filled gradually, and on December 27 waste began over the crest of the dam. The dam is in good condition.

Whitehall Pond.

Elevation, H.W., 327.91; Bottom of Gates, 317.78.
Area at 327.91, 601 acres; Contents, between 327.91 and 317.78, 1,256,900,000 gals.

On January 1, 1895, the water surface of this pond was 323.23 feet, or 4.68 feet below high water. It rose during the spring, the water surface on May 1 being 326.95, or .96 feet below high water. It remained at about this height until June 15, when it fell; and on October 12 the water surface was 323.22.

Since October 12 it has been gradually filling. Water was drawn from the pond, for the supply of the city, from March 25 to April 5, April 9 to 12, April 15 to 20, April 30 to May 23, June 14 to July 24, August 8 to October 14, and November 27 to January 1, 1896. Plans for a new dam at Whitehall pond have been perfected.

Farm Pond.

Grades, H.W., 149.25; Low Water, 146.00.
Area at 149.25, 159 acres; Contents, between 149.25 and 146.00, 165,500,000 gals.

No water was drawn from this pond for the supply of the city during the year 1895.

On January 1, 1895, the surface of the pond was 46 feet below high water. High-water mark was reached on January 23, and on April 15 the water surface was at grade 149.70.

It remained at or above 149.00 until August 20. The lowest point reached was on September 29, and on October 14 high-water mark was again reached, remaining at that height during November and December. The Framingham Water Company has drawn 132,200,000 gallons from the pond during the year.

Lake Cochituate.

Grades, H.W., 134.36; Invert Aqueduct, 121.03; Top of Aqueduct, 127.36.
Area, Water Surface at 134.36, 785 acres; Contents, between 134.36 and 127.36, 1,515,180,000 gals.; between 134.36 and 125.03, 1,910,280,000 gals.
Approximate Contents, between 134.36 and 121.03, 2,447,000,000 gals.; Between 134.36 and 117.03, 2,907,000,000 gals.

The dam is in good condition. On January 1, 1895, the surface of the lake was 8.08 feet below high-water mark.

It remained at about this level until March 1, when it began to rise. On March 10 water was turned into the lake from the Sudbury river, and on April 15 the water surface

was at high-water mark. It remained at about high-water mark until May 5, after which its surface fell until October 12, being 128.28 on that day. On January 1, 1896, the water surface was 132.30, or 2.06 feet below high-water mark.

The beds for filtering the water of Pegan brook have been in use for the greater portion of the year, and 273,698,000 gallons have been pumped upon them. No difficulty has been experienced in their operation during the winter season.

Water has been drawn from the different reservoirs as follows:

From	7	A.M.	Jan. 1	to	2	P.M.	Apr. 8	from Reservoir	No. 1.
"	2	P.M.	Apr. 8	"	11.40	A.M.	June 27	" "	Nos. 2, 3.
"	11.40	A.M.	June 27	"	11	A.M.	July 19	" "	No. 2.
"	11	A.M.	July 19	"	7	A.M.	July 24	" "	Nos. 2, 3.
"	7	A.M.	July 24	"	12	M.	Oct. 1	" "	No. 2.
"	12	M.	Oct. 1	"	2	P.M.	Oct. 3	No flow.	
"	2	P.M.	Oct. 3	"	10	A.M.	Oct. 13	from Reservoir	Nos. 2, 3.
"	10	A.M.	Oct. 13	"	11	A.M.	Oct. 24	" "	No. 2.
"	11	A.M.	Oct. 24	"	7	A.M.	Nov. 25	" "	Nos. 2, 3.
"	11	A.M.	Nov. 25	"	11	A.M.	Dec. 3	" "	No. 2.
"	11	A.M.	Dec. 3	"	1	P.M.	Dec. 5	No flow.	
"	1	P.M.	Dec. 5	"	11	A.M.	Dec. 23	from Reservoir	Nos. 2, 3.
"	11	A.M.	Dec. 23	"	7	A.M.	Jan. 1	" "	No. 2.

The height of the water in the various storage reservoirs on the first day of each month is given below:

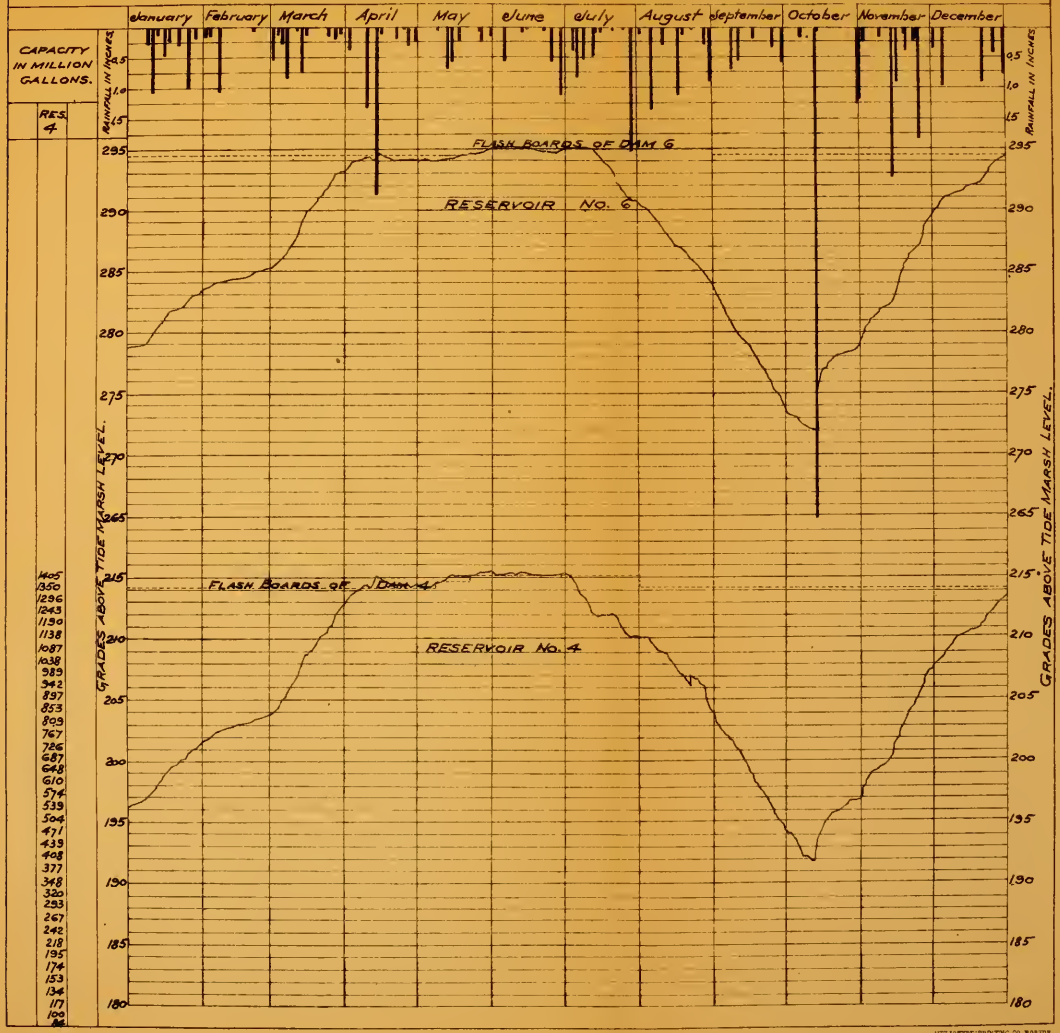
	Reservoirs.					Farm Pond.	Whitehall Pond.	Lake Cochituate.
	No. 1.	No. 2.	No. 3.	No. 4.	No. 6.			
	Top of Flashboards.	Top of Flashboards.	Crest of Dam.	Crest of Dam.	Top of Flashboards.	High Water.	High Water.	Top of Flashboards.
	159.29	167.12	175.24	214.23	295.00	149.25	327.91	134.36
January 1, 1895 . .	156.50	166.00	175.24	196.18	278.84	148.79	323.23	126.28
February 1, " . .	157.83	166.05	175.45	201.65	283.48	149.06	324.26	126.90
March 1, " . .	156.46	161.22	172.47	203.79	285.21	149.01	324.63	126.50
April 1, " . .	157.86	166.16	175.66	212.91	293.42	149.35	325.71	132.97
May 1, " . .	157.86	166.09	175.37	214.60	294.28	149.63	326.95	134.35
June 1, " . .	159.25	166.05	174.68	215.34	295.02	149.32	326.98	134.04
July 1, " . .	159.04	164.23	169.46	215.31	295.04	149.01	325.81	133.09
August 1, " . .	158.91	163.97	170.47	210.25	290.58	149.00	325.28	131.72
September 1, " . .	158.68	163.30	172.50	203.98	283.91	148.89	324.62	130.20
October 1, " . .	158.32	163.14	172.57	194.41	273.64	148.58	323.68	128.98
November 1, " . .	157.91	167.15	175.66	197.35	279.19	149.27	324.73	129.63
December 1, " . .	158.10	166.23	175.77	207.83	289.92	149.36	326.36	132.71
January 1, 1896 . .	158.11	166.17	175.75	213.86	294.39	149.67	325.29	132.30

C H A R L
PUBLIC GARDEN
FORT
S O U T H

PLAN OF
BOSTON PROPER
SHOWING CHANGES IN
STREET AND WHARF LINES
1795 TO 1895
BY
Charles C. Perkins
Surveyor in charge of City Proper Surveys
January 31st 1895
EXPLANATION
Original shore line
Wharf line in 1796 from Survey by Osgood Carleton
Wharf line abt 1850 from Survey by A Andrews and City Plans
Wharf line in 1895 from City Surveys
Old streets existing in 1795 from Survey by Osgood Carleton
Streets laid out since 1796 which exist in 1895 from City Plans
Old street lines dotted where widenings have been made
Where street has had more than one name the old name is given between the street lines and the latest name on the side
Streets discontinued
Parks and Squares
CHARLES RIVER
CHARLESTOWN
UNITED STATES NAVY YARD
UNION STATION
COMMON
BOSTON HARBOR
CHANNEL
PIER 1
PIER 2
HANOVER
COMMERCIAL
WASHINGTON
CENTRAL WHF
LONG WHARF
INDIA WHF

Boston Water Works.

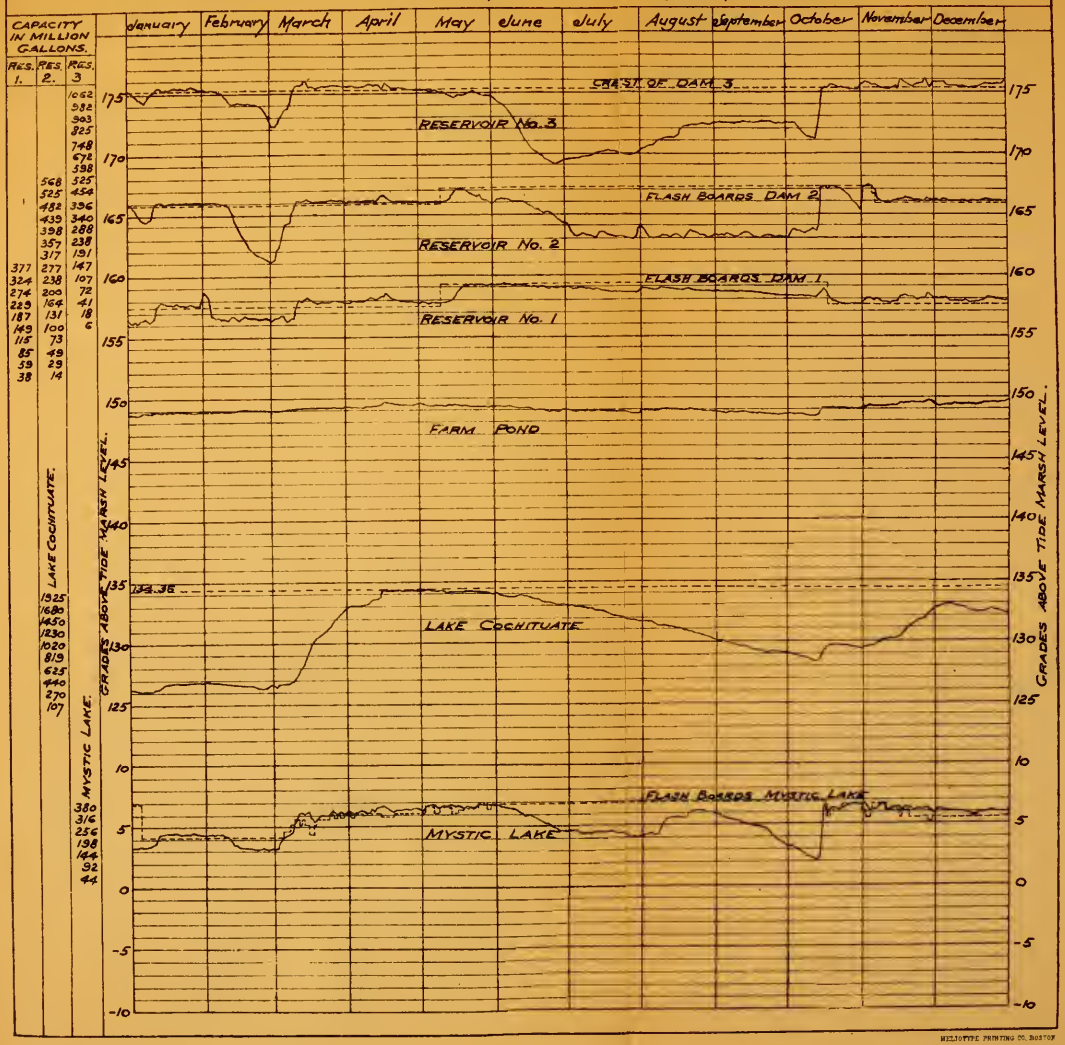
Diagram showing the heights of Sudbury River Reservoirs Nos. 4 and 6, and the Rainfall on the Sudbury River Water Shed during the year 1895.



HELIOTYPE PRINTING CO. BOSTON

Boston Water Works.

Diagram showing the heights of Sudbury River Reservoirs Nos. 1, 2 and 3, Farm Pond and Cochituate and Mystic Lakes during the year 1895.



HELIOTYPE PRINTING CO. BOSTON

AQUEDUCTS AND DISTRIBUTING RESERVOIRS.

The Sudbury-river aqueduct has been in use 335.9 days, and has delivered 12,908,500,000 gallons into Chestnut-Hill Reservoir, and 896,800,000 gallons into Lake Cochituate. The Cochituate aqueduct has been used 361 days, and delivered 5,654,765,700 gallons. Both aqueducts have been cleaned during the year.

The different distributing reservoirs are in good condition.

HIGH-SERVICE PUMPING-STATIONS.

The daily average quantity pumped at the Chestnut-Hill station was 9.4 per cent. more than in 1894.

Engine No. 1 was run 4,341 hours 12 minutes, pumping . .	1,739,232,730 gallons.
Engine No. 2 was run 2,285 hours 35 minutes, pumping . .	919,218,525 "
Engine No. 3 was run 1,793 hours 16 minutes, pumping . .	1,507,338,275 "
Total amount pumped . . .	4,165,789,530 "
Amount coal used by Engines Nos. 1 and 2	3,363,475 lbs.
Amount coal used by Engine No. 3,	1,503,331 "
Total amount coal used . .	4,866,806 "
Percentage ashes and clinkers .	10.3
Quantity pumped per lb. of coal, Engines Nos. 1 and 2 . .	790.4 gallons.
Quantity pumped per lb. of coal, Engine No. 3	1,002.7 "
Daily average amount pumped .	11,413,100 "

Table VII., on pages 87, 88, shows in detail the work done by the engines and boilers.

COST OF PUMPING.

Salaries	$14,854 11
Fuel	11,261 46
Repairs	803 09
Oil, waste, and packing	1,759 73
Small supplies	2,888 46
Total	$31,566 85
Cost per million gallons pumped to reservoir,	$7 58

The following are notes of a practice test of Engine No. 3, made by students of Massachusetts Institute of Technology, under the direction of Professor Miller:

Fire started under boiler	8.30 A.M.
Engine started	9.08 "
Engine test began	9.15 "
Engine test ended	9.15 "
Length of engine trial (steam basis) . .	24 hours
Length of engine trial (coal basis) . .	24.3 "
Revolutions, 9.08 A.M. to 9.26 A.M. . .	73,516
Revolutions, 9.15 " 9.15 " . .	72,843
Coal burned	16,839 lbs.
Coal burned, less 200 lbs. allowance for falling grate	16,639 "
Water received from engine and weighed to boiler	142,528 "
Cold water make up	8,532 "
Total amount weighed to boiler	151,060 "
Less leakage from feed pump	1,440 "
	149,620 "
Steam required by plant for 24 hours, except H.P. jackets	146,226 "

TEMPERATURES.

Engine-room	23.3° C.
Condensed steam from air pump	89.3 F.
Cold condensing water	51.9
Hot condensing water	85.2
Feed water to economizer	127.
Feed water to boiler from economizer . .	198.3
Jacket return at engine	370.6
Jacket return at boiler	369.6
Gases entering economizer	502.
Gases leaving economizer	233.

PRESSURES.

Barometer	14.85 lbs.
Steam at throttle	175.7 "
Vacuum in condenser	27.25 in.
First receiver	46.5 lbs.
Second receiver	2.4 "
Low-pressure jacket	99.6 "
High-pressure jacket	175.7 "
Draught in inches	0.375

		Head.	Crank.	Total.	
Horse power.	High.	80.78	70.08	150.86	
	Int.	97.05	89.09	186.14	
	Low.	117.12	121.54	238.66	Tot., 575.66

		Pump end.	Steam end.	Total.	
Pump H.P.	High.	90.12	85.95	176.07	
	Int.	91.59	87.36	178.95	
	Low.	87.90	86.94	174.84	529.86

Steam per H.P. per hour, engine alone	11.22 lbs.
Coal per H.P. per hour, whole plant	1.18 "
Lift in feet	137.48 ft.
Water over weir, 24 hours	21,016,000 gals.
Slip	1.83 per cent.
Duty per 100 lbs. coal	150,045,000
Duty per 1,000,000 B.T.U.	145,470,000
Duty per 100 lbs. combustible	160,000,000

At the West Roxbury pumping-station the daily average quantity pumped was 179,200 gallons, an increase of 47.5 per cent. over the amount pumped in the previous year.

At the East Boston station 465,500 gallons per day have been pumped for the supply of the high-service district, and 39,300 gallons per day for the Breed's Island high-service.

HIGH SERVICE.

In 1870 the high-service works were established, with a capacity of 5,000,000 gallons daily with no storage.

In 1874 a reservoir was built on Parker Hill, with a capacity of 7,200,000 gallons, the average daily consumption being at that time 1,200,000 gallons. Late in 1885 the consumption of water from the high service had reached 2,500,000 gallons daily; the demand for its extension was pressing, and a new pumping-station with a capacity of

16,000,000 gallons daily was constructed at Chestnut-Hill reservoir, and an additional reservoir at Fisher Hill having a capacity of 15,400,000 gallons, making with the Parker-Hill reservoir a total storage capacity of 22,600,000 gallons.

In 1894 the consumption had reached over 11,000,000 gallons daily, and a new pump was added to the Chestnut-Hill plant having a capacity of 20,000,000 gallons daily.

The consumption for high service for the year 1895 averaged 10,384,600 gallons daily, the maximum being 11,719,300 gallons; it is evident that our present reserve in the Parker and Fisher Hill reservoirs is not sufficient, and an additional reservoir or reservoirs should be constructed at once with as large a capacity as it is practicable to obtain. It would be desirable to have, were it possible, a reservoir storage of 200,000,000 gallons.

Owing to the rapid increase of the portion of the city which is supplied from the high service, steps should also be taken at once, looking to the addition of another engine to the present plant. The experience of the past shows that it requires several years to design and build a pumping-engine, and at the present rate of increase in the high-service consumption the safe capacity of the present plant will have been reached by the time an additional engine can be supplied if work is commenced at once on the plans.

Mystic Lake.

Grades, H.W., 7.00; Invert of Aqueduct, —4.17; Contents, between 7.00 and 1.50, 442,000,000 gallons.

On January 1, 1895, the lake surface was 3.63 feet below high water. On March 4 it had risen to grade 4.14, and the stop-planks were placed upon the dam, waste occurring over the stop-planks from March 9 to May 29. On May 29 the water surface was at 6.85; falling gradually, it reached grade 4.08 on July 29. The fish-way was opened on April 16, and was kept open until June 20, when it was closed, and remained closed the remainder of the year.

The lowest point reached during the year was on October 12, the water surface being at grade 2.15, or 4.85 feet below high water.

Waste occurred over the dam from October 15 to January 1, 1896, with the exception of five days in the early part of November.

The dam at the outlet of the lake is in good condition.

MYSTIC VALLEY SEWER.

The operation of this plant by the city ended on July 18, 1895, when the Metropolitan Sewerage Commission assumed control of it. During the time of operation, 70,013,500 gallons of sewage were pumped and chemically treated with sulphate of aluminum. Table XI., on page 92, gives the monthly quantities of sewage pumped, coal and aluminum used.

MYSTIC CONDUIT AND RESERVOIR.

The conduit has been cleaned several times during the year.

The repairs recommended at the conduit screen-chamber, namely, replacing the wooden sills with stone sills and the renewing of the grooves for the screens, have been made during the year.

MYSTIC PUMPING-STATION.

Engine No. 1 was used 3,240 hours, pumping	720,723,300 gals.
Engine No. 2 was used 1,392¾ hours, pumping	295,205,000 "
Engine No. 3 was used 6,676⅔ hours, pumping	2,276,190,200 "
Engine No. 4 was used 380 hours, pumping	163,704,200 "
Total quantity pumped . . .	3,455,822,700 "
Daily average quantity pumped .	9,468,000 "
Total quantity of coal burned . .	8,121,000 lbs.
Percentage ashes and clinkers . .	10.9
Quantity pumped per lb. of coal .	425.5 gals.

COST OF PUMPING.

Salaries	$11,560 94
Fuel	13,650 80
Repairs	2,867 04
Oil, waste, and packing	1,161 60
Small supplies	1,328 69
Total	$30,569 07

Cost per million gallons pumped to reservoir, $8.84

Table VIII., on page 89, shows in detail the work done by the engines during the year. The foundation for Engine No. 4 was finished and ready for the erection of the engine on April 1, 1895, and about April 15 the G. F. Blake Manufacturing Company commenced to deliver parts of the pump and began the work of erecting the engine. The engine was run for the first time on August 28, and has been in use more or less since that time. It has been lagged, painted, etc., and is now practically finished and ready to be accepted by the city. The engine has not yet been tested by the city.

The Mystic Pumping-engine No. 4 is an independent compound beam and flywheel engine of the Leavitt type, and operates two differential plunger pumps.

The steam cylinders are vertical and inverted, one high and one low pressure, with pistons connected to opposite ends of the beam.

The pumps are located beneath the engine bedplate, in a masonry pit, and their plungers are rigidly connected to the steam-piston crossheads.

The high-pressure piston with its connected pump plunger makes its upward stroke at the same time that the low-pressure piston and its plunger are making their downward stroke, and *vice versa*.

The pumps rest upon solid masonry foundations at the bottom of the pit, to which they are strongly bolted; their upper ends are firmly secured to the engine bedplate by adjustable stools and bolts.

The discharge from the pump worked by high-pressure piston is into the delivery chamber of the pump worked by the low-pressure piston, from whence it enters the force main. Similarly the suction main connects with the low-pressure pump inlet chamber, with which the inlet chamber of the high-pressure pump is connected.

Each pump consists of three principal sections, viz.: the upper chamber, forming the air vessel and containing the delivery valves; middle chamber, containing the suction valves; and lower or inlet chamber, which is constructed to form a vacuum chamber.

The pump valves consist of thin flat rings of composition, working over annular openings in the valve seats and closed by springs.

The pedestals for the main beam pin and crank shaft journals are formed in the engine bedplate, and are all in the same horizontal plane.

The main framing for supporting the steam cylinders con-

sists of two massive columns forming the crosshead guides and five auxiliary columns, all of which have their bases bolted to the bedplate and their caps to the entablature.

The steam distribution is effected by Corliss valves and valve gear, with separate eccentrics for the inlet and exhaust gear.

The cylinders are thoroughly steam-jacketed on sides and ends, and the exhaust from the high-pressure cylinder enters a reheater filled with tubes containing high-pressure steam, on its way to the low-pressure cylinder.

All heated surfaces are thoroughly protected from radiation by approved non-conductors and handsome black walnut lagging.

The condensing apparatus is of the jet type, with a double-acting horizontal air pump worked from the beam.

There is a cast-iron gallery surrounding the cylinder bases, which is provided with a polished brass handrail and finished wrought-iron stanchions; the gallery is reached by an iron stair at the low-pressure end of the engine.

The leading dimensions of the engine are:

The high-pressure cylinder is bored 21 inches and the low-pressure cylinder 42 inches diameter, with 4-foot stroke of pistons.

The upper pump plungers are turned $14\frac{7}{8}$ inches and the lower plungers 21 inches diameter, with a stroke of 4 feet.

The radius of the beam is 51 inches to centres of link and connecting-rod attachments, and 17 inches to centre of pin working air pump.

The air pump is $16\frac{3}{8}$ inches diameter by 16 inches stroke.

The horizontal distance between centres of cylinders and pumps is 8 feet, ditto between centres of main beam pin, and crank shaft 10 feet $8\frac{5}{32}$ inches.

The length of connecting rod from centre to centre of journals is 10 feet, and of the steam links 3 feet $\frac{1}{2}$ inch. The radius of the crank is 2 feet.

Diameter of flywheel is 18 feet; weight of same, about 17 tons.

Speed of the engine for regular working capacity, 51 revolutions per minute. Displacement capacity at above speed in U. S. gallons per 24 hours amounts to 10,570,000.

The working boiler-pressure is 100 pounds per square inch above atmosphere.

The following preliminary test of Engine No. 4 was made by the builders, The Geo. F. Blake Manufacturing Co., December 13–14, 1895:

Duration of test, 24 hours 30 seconds.
Total number of revolutions, 74,385.
Pressure by gauge near engine, 95.3 lbs.
Pressure by gauge on receiver, 5.9 lbs.
Pressure by mercurial column on condenser, 27.3 ins.
Total pressure per square inch on pump, 65.7 lbs.
Revolutions per minute, 51.7.

Horse-powers: High-pressure steam cylinder, top, 74.5; bottom, 79.65; total, 154.15. Low-pressure steam cylinder, top, 83.19; bottom, 83.71; total, 166.9. Both steam cylinders, total, 321.05.

Horse-power of main pump cylinders, 284.86.

Water pumped in 24 hours by displacement, 10,703,000 gals.

Total coal burned during the test, 10,661 lbs.
Water pumped per pound of coal, 1,004 gallons.
Coal per pump horse-power, per hour, 1.56 lbs.
Duty per 100 lbs. of coal, 127,000,000 ft. lbs.

CONSUMPTION.

The daily average consumption for the year was as follows:

Sudbury and Cochituate works . .	50,801,100 gals.
Mystic works	9,467,000 "
Total for the combined supplies .	60,268,100 "

an increase of 3,426,000 gallons, or 6 per cent., from that of the previous year.

On account of the limited quantity of the Mystic supply at the beginning of the year, all of Charlestown District lying east of Cambridge street has been supplied from the Cochituate works during the entire year, with the exception of the periods between February 6 to 21, and May 18 to July 13.

The following table shows the consumption per inhabitant for the past two years:

MONTH.	Cochituate.		Mystic.		Combined Supplies.	
	Consumption in Gallons per Capita.		Consumption in Gallons per Capita.		Consumption in Gallons per Capita.	
	1894.	1895.	1894.	1895.	1894.	1895.
January	108.1	104.9	91.9	92.0	104.5	102.7
February	109.6	129.4	95.4	94.8	106.5	120.7
March	99.7	107.1	83.0	83.5	96.0	102.9
April	88.9	94.5	79.0	77.3	86.7	91.5
May	92.6	97.3	82.1	77.6	90.2	93.3
June	101.4	102.0	96.4	83.2	100.3	97.6
July	110.3	104.2	93.3	76.8	106.5	93.7
August	104.0	107.0	81.8	76.5	99.0	101.6
September	98.2	107.1	94.3	93.3	97.6	104.7
October	95.0	98.9	80.1	81.1	92.6	95.8
November	94.8	96.7	81.3	78.8	92.7	93.6
December	97.5	105.9	92.8	86.1	96.7	102.4
Average	99.8	104.3	87.6	83.3	97.4	100.3

The daily average consumption was, last year, 24 per cent. in excess of the dry-year capacity of the combined system of water supply.

WHITEHALL POND.

Last June plans and specifications were prepared for a new dam at the outlet of Whitehall pond, for the purpose of increasing the storage capacity of the pond, but on account of complications arising by reason of the proposed taking of the supply systems by the State, nothing was done. It is now so evident, however, that the proposed increased storage of Whitehall pond is necessary that the construction of the new dam should be no longer delayed.

CORROSION OF PIPES BY ELECTROLYSIS.

The investigations of the effect of electrolysis upon the water-pipes have been continued during the year, under the supervision of Messrs. Stone & Webster, and in brief the results arrived at are as follows:

William Jackson, *City Engineer, Boston, Mass.:*

Dear Sir: In our reports for the years 1893 and 1894 we considered the theory of electrolytic corrosion of water-pipes, giving detailed accounts of the experiments we were carrying on, and of our methods of investigation.

For the past year we have spent a great deal of time in taking hydrant readings in almost every part of the city where electric-car tracks are located, and have already made three minor reports on the work.

During the summer of 1895 we confined our investigations to the most thickly-settled portion of the city, and along the car lines extending into the suburbs. These investigations showed that the electrical condition of the pipes had changed for the better. Readings taken at the service-pipe stations, which we installed in 1894, as described in our report for that year, showed also that there has been a marked improvement.

In the fall we confined our investigations to the district about Brighton. Here in one locality we found slight indications of electrolytic corrosion, and in our report for November we suggested the remedy of bending the pipes to the tracks at a point on Cambridge street.

Owing to the fact that the ground was frozen, and to the unfavorable condition of the weather, we were unable to renew electrolytic investigations until the last of March. Since that time, however, we have made careful investigations in Charlestown and East Boston, and have found no indications of danger in these districts. This result is in accordance with the observations made last summer. At the time of writing this report we are carrying on investigations in South Boston, the indications being that there are some points of danger; but we have not arrived at conclusions sufficiently definite to be incorporated here.

The electrical conditions of the pipes is in the main improving, showing that measures have been taken to lessen the possibility of corrosion. Notwithstanding this improvement, there are districts which are not entirely free from electrolytic action; and, moreover, there is always liability to corrosion at isolated points, as well as the ever-present danger due to deterioration of rail bonds and supplementary return wires.

(Signed) Stone & Webster.

DISTRIBUTION.

On the Cochituate works 26¼ miles of pipe were laid and 2⅓ miles abandoned, making a net increase of 23.1 miles and a total of 595.9 miles now connected with the system.

A 20-inch main for the supply of Brighton was laid as far as Brighton avenue early in the season, and was in service in June.

The 30-inch main for the South Boston low service was extended from Washington Village, through Dorchester avenue and D street, as far as Congress street, a length of 8,373 feet.

For the improvement of the high service in Roxbury and Dorchester, the 48-inch, 42-inch, and a part of the 36-inch lines, recommended in 1894, were laid during the year; the 48-inch pipe extends from the junction of Fisher avenue and Boylston street through Boylston, Walnut, and Washington streets in Brookline, and through Huntington avenue, to Heath street, a length of 8,290 feet; 7,965 feet of this were laid by contract. At Heath street the pipe is divided into 42-inch and 36-inch lines; the 42-inch pipe continues through Huntington avenue, Clarendon street, Newbury street, the Public Garden and the Common, to Park street. Connection is made with the 20-inch high-service pipe in Huntington avenue, at Wait and Gainsboro' streets. On the Common, after connecting with the 20-inch high-service pipe, the 42-inch line is reduced to 30 inches. Opposite Temple place the 30-inch pipe is again reduced to 16-inch and continued to Park street. The length of 42-inch pipe laid was 15,478 feet, of which 9,186 feet were laid by contract. Water was let on to the 48 and 42 inch lines as far as Wait street on October 20, 1895.

From Huntington avenue and Heath street the 36-inch line runs through Heath street as far as Parker street, and is connected with the 24-inch high-service pipe at Hayden street and at Parker street. These new lines have given an increased pressure in Roxbury and Dorchester, of nine and six pounds respectively at times of minimum pressure; when the water was turned on, Parker-Hill Reservoir quickly filled up, and was shut off to prevent overflowing. It is now out of service, and will be maintained as a reserve reservoir for use in emergency.

A small pumping-plant has been established on Wayne street, at Blue Hill avenue, to improve the service in the Elm-Hill district.

The distributing mains connected with the Mystic works

have been extended 4.9 miles, and 7.4 miles have been relaid. The total length now in service is 178.6 miles.

There has been an increase of 242 in the number of hydrants connected with the Cochituate works, making a total now in use of 6,459.

On the Mystic works 97 hydrants have been added, and the total now in use is 1,543.

260 petitions for main pipe have been reported upon, and 88 contracts for rock excavation have been made.

Various profiles have been made, levels taken, and lines and grades furnished for the main-pipe laying.

All pipe laid has been located and plotted on the plans.

During a severe spell of cold weather in January the pipes between the islands in the harbor were frozen, and burst in a number of places. Service between Moon and Long Islands was at once reëstablished by laying a 2-inch lead pipe, and as soon as practicable contracts were awarded for laying 6-inch pipe, with Ward's flexible joints, between Long and Moon Islands and Long and Gallop's Islands. In each case the pipes were laid in a trench excavated 6 feet deep between mean high-water marks. After the lines were tested the trenches were carefully back-filled. A contract has also been awarded for laying a 4-inch flexible pipe from Long Island to Rainsford Island. This work is now in progress.

Appended to this report will be found the usual tables of rainfall, consumption, etc., for the past year, and in addition, tables are given of the rainfall, rainfall collected, and percentage collected on the Cochituate water-shed since 1863, on the Sudbury-river water-shed since 1875, and on the Mystic water-shed since 1878. These will be found valuable for future reference.

GENERAL STATISTICS.

SUDBURY AND COCHITUATE WORKS.	1892.	1893.	1894.	1895.
Daily average consumption in gallons....	41,312,400	47,453,200	46,560,000	50,801,100
Daily average consumption in gallons per inhabitant.....	96.1	107.5	99.8	104.3
Daily average amount used through meters, gallons.....	11,225,900	11,651,600	11,170,400	12,084,500
Percentage of total consumption metered.	27.2	24.5	24.0	23.8
Number of services.....	65,074	66,586	68,556	70,879
Number of meters and motors.....	4,412	4,585	4,877	4,910
Length of supply and distributing mains, in miles	536	560	572.8	595.9
Number of fire-hydrants in use	5,793	6,042	6,217	6,459
Yearly revenue from water-rates	$1,433,413 78	$1,637,531 94	$1,644,405 25	$1,784,954.01
Yearly revenue from metered water.....	$649,672 31	$683,948 52	$672,474 17	$711,467.39
Percentage of total revenue from metered water	45.3	41.8	40.9	39.9
Cost of works on February 1.....	$22,243,351 56	$22,727,456 03	$23,583,967 89	$25,052,227.53
Yearly expense of maintenance.....	$392,762 21	$433,408 18	$440,840 63	$420,907.09
MYSTIC WORKS.				
Daily average consumption in gallons....	9,810,800	10,742,500	10,282,100	9,467,000
Daily average consumption in gallons per inhabitant	78.8	84.4	87.6	83.3
Daily average amount used through meters, gallons.....	1,862,200	1,921,570	2,014,000	2,105,800
Percentage of total consumption metered.	19.0	17.9	19.6	22.2
Number of services.....	21,588	22,398	23,257	24,120
Number of meters and motors	550	482	515	525
Length of supply and distributing mains, in miles	160	165	173.7	178.6
Number of fire-hydrants in use.....	1,223	1,306	1,446	1,543
Yearly revenue from water-rates	$394,008 75	$421,573 48	$447,554 35	$481,017.15
Yearly revenue from metered water.....	$105,685 56	$109,367 37	$115,811 32	$121,436.10
Percentage of total revenue from metered water.....	26.8	25.9	25.9	25.2
Cost of works on February 1.....	$1,713,227 00	$1,721,609 33	* $1,676,471 94	$1,803,775.29
Yearly expense of maintenance.....	$129,354 49	$160,643 97	$156,214 05	$189,194.61

* $52,637.00 credited on account of sale of portion of Mystic Sewer.

TABLE I.

Daily Average Consumption of Water, in Gallons, from the Cochituate and Mystic Works.

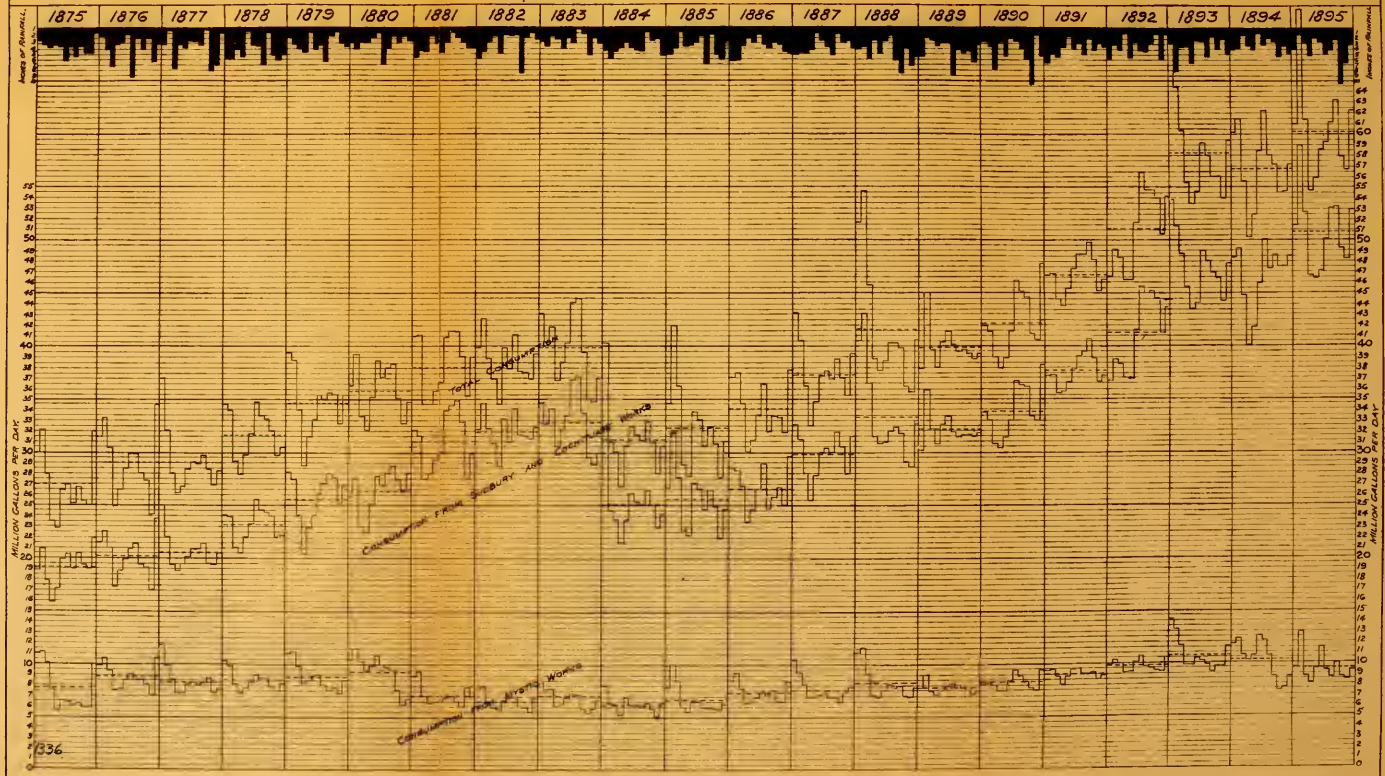
	COCHITUATE WORKS.							MYSTIC WORKS.							
MONTH.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
January	30,172,000	33,680,000	37,230,100	36,756,400	53,847,100	48,395,000	51,476,100	11,107,100	7,769,500	8,187,900	9,389,300	9,878,200	14,129,700	11,823,500	[3]9,528,100
February	35,855,200	33,030,700	37,280,700	38,881,500	51,299,400	49,207,500	58,905,100	11,620,900	9,073,600	8,299,700	9,466,900	10,332,200	13,174,700	12,295,000	12,953,200
March	32,180,000	30,844,400	35,533,400	38,395,100	48,700,200	44,844,300	52,706,700	9,242,000	7,537,600	8,055,800	8,811,000	9,970,500	11,692,700	10,720,800	8,712,200
April	30,814,500	30,446,600	35,751,600	37,171,000	45,573,100	40,070,200	46,614,200	7,276,700	7,185,700	7,481,600	8,045,800	9,145,000	9,812,500	10,236,200	8,098,000
May	32,719,500	31,381,200	36,580,700	37,055,900	43,451,500	41,827,700	46,470,500	6,932,300	7,663,600	7,488,400	8,841,300	9,204,900	9,817,400	10,661,000	9,426,500
June	33,377,900	33,022,700	37,801,900	41,564,000	44,125,100	45,906,400	47,089,500	7,615,200	8,017,700	8,396,000	9,478,400	10,146,300	[1]10,460,000	12,552,300	11,509,200
July	31,870,300	36,701,100	39,062,600	45,738,100	48,986,900	50,044,000	50,064,800	8,267,500	8,315,600	9,463,300	9,581,700	10,702,900	[1]10,167,000	12,172,000	9,265,900
August	31,403,200	36,316,000	39,460,400	45,031,600	48,062,000	47,288,500	53,095,100	7,859,100	8,113,200	8,932,200	9,122,300	9,751,500	9,826,200	10,696,700	8,117,400
September . . .	31,722,800	36,165,800	40,677,700	45,261,900	46,926,500	[2]48,558,700	53,246,900	7,266,300	7,966,000	8,436,700	9,128,700	9,549,400	9,115,000	[2]8,703,600	9,937,900
October	31,702,200	33,429,800	53,884,600	44,626,700	46,416,600	47,072,500	49,278,000	7,096,400	7,627,500	7,784,100	9,259,100	9,340,500	9,630,400	7,421,200	8,667,300
November . . .	31,532,400	32,955,100	36,640,800	41,347,800	44,328,900	47,101,500	48,258,600	6,990,800	7,316,700	7,601,300	8,585,200	9,230.000	9,569,700	7,563,100	8,453,400
December . . .	31,829,000	38,334,100	37,342,500	43,766,400	47,807,800	48,511,600	52,934,800	7,918,600	7,473,200	9,448,300	8,960,600	10,473,700	11,620,800	8,667,800	9,276,700
Yearly average .	32,070,000	33,871,700	37,686,900	41,312,400	47,453,200	46,560,000	50,801,100	8,258,400	7,830,500	8,301,400	9,055,290	9,810,800	10,742,500	10,282,100	9,457,000

[1] From June 7 to July 29 about 3,000,000 gallons per day were wasted from a blow-off.
[2] After September 12 Charlestown was supplied with Cochituate water.
[3] Charlestown was supplied with Cochituate water from January 1 to February 6, February 21 to May 18, and July 13 to January 1, 1896.

BOSTON WATER WORKS.

Diagram showing the rainfall and daily average Consumption for each month.

Yearly Averages shown thus - - - - -



HELIOTYPE PRINTING CO. BOSTON

TABLE II.

Diversion of Sudbury-River Water, 1888–1895.

Month.	1888.	1889.		1890.	1891.	1892.		1893.	1894.		1895.	
	To Chestnut Hill Res'r.	To Lake Cochituate.	To Chestnut Hill Res'r.	To Chestnut Hill Res'r.	To Chestnut Hill Res'r.	To Lake Cochituate.	To Chestnut Hill Res'r.	To Chestnut Hill Res'r.	To Lake Cochituate.	To. Chestnut Hill Res'r.	To Lake Cochituate.	To Chestnut Hill Res'r.
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*
January	894,400,000	. . . . .	484,500,000	518,600,000	715,900,000	. . . . .	630,800,000	1,325,900,000	. . . . .	1,012,000,000	1,300,000	1,186,100,000
February	906,700,000	. . . . .	564,600,000	475,000,000	560,800,000	. . . . .	610,400,000	957,600,000	. . . . .	944,000,000	. . . . .	1,318,400,000
March	691,400,000	. . . . .	584,500,000	498,600,000	573,200,000	45,100,000	625,200,000	1,023,900,000	529,100,000	947,100,000	680,000,000	1,115,800,000
April	468,800,000	. . . . .	490,500,000	417,000,000	641,900,000	545,000,000	662,500,000	917,000,000	131,100,000	725,600,000	. . . . .	982,300,000
May	566,300,000	233,400,000	615,700,000	536,300,000	740,300,000	114,700,000	690,490,000	858,600,000	215,800,000	826,500,000	87,700,000	931,500,000
June	489,000,000	. . . . .	567,600,000	513,100,000	629,500,000	197,500,000	779,300,000	856,700,000	80,700,000	875,500,000	114,000,000	941,100,000
July	528,900,000	. . . . .	534,000,000	664,100,000	755,100,000	. . . . .	948,000,000	1,040,800,000	. . . . .	1,064,600,000	. . . . .	1,061,900,000
August	626,600,000	. . . . .	443,700,000	625,500,000	722,900,000	. . . . .	897,700,000	994,100,000	. . . . .	951,600,000	. . . . .	1,147,600,000
September . . .	581,600,000	. . . . .	475,500,000	606,400,000	732,400,000	. . . . .	876,300,000	948,300,000	. . . . .	987,100,000	. . . . .	1,142,800,000
October	435,900,000	. . . . .	414,100,000	539,900,000	715,300,000	. . . . .	908,500,000	956,600,000	1,100,000	958,500,000	6,600,000	951,700,000
November . . .	410,900,000	. . . . .	454,600,000	526,000,000	752,200,000	. . . . .	788,000,000	862,700,000	400,000	1,021,000,000	5,600,000	998,600,000
December	605,200,000	. . . . .	501,200,000	675,500,000	767,100,000	. . . . .	1,216,100,000	995,700,000	1,000,000	1,137,100,000	1,600,000	1,130,700,000
Totals	7,224,700,000	233,400,000	6,130,500,000	6,596,000,000	8,306,600,000	902,300,000	9,633,200,000	11,737,900,000	962,200,000	11,450,600,000	896,800,000	12,805,300,000
Total diversion from Sudbury river.	7,224,700,000	6,363,900,000		6,596,000,000	8,306,000,000	10,535,500,000		11,737,900,000	12,412,800,000		13,805,300,000	
Average daily diversion for whole year.	19,739,600	17,435,300		18,071,200	22,757,800	28,800,000		32,158,600	34,007,700		37,822,700	

TABLE III.

Statement showing Amount of Water drawn from Lake Cochituate; Amount wasted; Amount of Rainfall collected in Lake; Amount received into Lake from Sudbury River; Percentage of Rainfall collected, etc., 1852 to 1895; Water-shed of Lake, 12,077 Acres.

YEAR.	Amount of Water drawn from Lake.	Amount of Water wasted from Lake.	Amount received into Lake from Sudbury River.	STORAGE.		Total Amount of Rainfall collected in Lake.	Daily average amount of Rainfall collected in Lake.	Rainfall.	Rainfall collected.	Percentage of Rainfall collected.
				Gain.	Loss.					
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Inches.*	*Inches.*	*Per cent.*
1852 [1]	2,974,042,800	4,020,566,900	.....	.....	261,360,000	6,733,249,700	18,396,900	47.93	20.61	43.
1853	3,117,939,500	3,166,417,500	.....	239,580,000	.....	6,523,937,000	17,873,800	55.73	19.51	35.
1854	3,614,230,000	4,187,733,000	.....	.....	217,800,000	7,584,163,000	20,778,500	43.15	22.87	53.
1855	3,776,399,500	No account kept	.....	.....	326,700,000	.....	.....	34.96	.....	.....
1856	4,409,787,600	"	.....	598,950,000	.....	.....	.....	40.80	.....	.....
1857	4,644,990,000	10,625,900,000	.....	32,670,000	.....	15,303,560,000	41,927,600	63.10	46.69	74.
1858	4,689,155,000	1,934,500,000	.....	.....	141,570,000	6,482,085,000	17,759,000	48.66	19.46	40.
1859 [2]	4,808,875,000	7,569,000,000	.....	283,140,000	.....	12,661,015,000	34,687,700	49.02	38.24	78.
1860	6,309,108,000	None.	.....	174,240,000	.....	6,483,348,000	17,714,100	55.44	19.40	35.
1861	6,639,095,900	3,377,559,000	.....	.....	1,459,260,000	8,557,394,900	23,444,900	45.44	25.45	56.
1862	6,059,000,000	33,200,000	.....	1,306,800,000	.....	7,399,000,000	20,271,200	49.69	22.36	45.
1863	5,927,052,500	2,165,696,500	.....	763,300,000	.....	8,855,049,000	24,260,400	69.30	26.88	39.
1864	6,105,306,700	1,368,746,000	.....	.....	1,848,577,000	5,625,475,700	15,370,200	42.60	18.35	43.
1865	4,621,630,000	1,688,120,700	.....	743,242,500	.....	7,052,993,200	19,323,300	49.46	20.50	41.
1866	4,463,585,000	None.	.....	743,242,500	.....	5,206,827,500	14,265,300	62.32	16.01	26.

1867	4,951,225,000	2,482,041,000	. . . . .	. . . . .	698,811,000	6,734,455,000	18,450,600	56.25	21.80	39.
1868	5,405,515,000	2,507,684,000	. . . . .	346,371,000	. . . . .	8,259,570,000	22,567,200	49.71	24.98	50.
1869	5,503,751,000	1,635,570,000	. . . . .	480,882,000	. . . . .	7,620,203,000	20,877,300	64.34	21.99	34.
1870	5,477,810,000	4,818,971,000	. . . . .	. . . . .	1,736,085,000	8,560,696,000	23,453,900	55.89	26.08	47.
1871	5,223,500,000	[1] None.	. . . . .	. . . . .	250,933,000	4,972,567,000	13,623,500	45.39	15.16	33.
1872	5,775,151,200	None.	1,676,666,400	1,543,995,500	. . . . .	5,642,480,300	15,416,600	48.47	17.22	35.
1873	6,511,826,900	2,917,977,000	. . . . .	. . . . .	515,132,000	8,914,671,900	24,423,800	45.43	27.13	60.
1874	6,623,972,900	1,145,851,700	. . . . .	. . . . .	1,367,715,000	6,402,109,600	17,540,000	35.93	19.52	54.
1875	7,092,955,500	None.	2,555,800,000	1,222,885,000	. . . . .	5,760,040,500	15,780,900	45.49	17.57	39.
1876	7,277,175,200	1,619,243,800	2,528,300,000	43,438,000	. . . . .	6,411,557,000	17,517,900	48.49	19.54	40.
1877	7,626,889,200	1,484,978,600	1,894,350,000	378,727,000	. . . . .	7,596,244,800	20,811,600	43.80	23.17	53.
1878	7,743,904,700	3,341,875,000	2,668,300,000	219,789,000	. . . . .	8,637,268,700	23,663,700	53.58	26.34	49.
1879	6,051,838,900	1,523,361,400	411,300,000	. . . . .	1,322,697,300	5,841,203,000	16,003,300	38.01	17.81	47.
1880	4,284,147,100	65,577,700	826,700,000	. . . . .	146,265,000	3,376,759,800	9,226,100	35.83	10.30	29.
1881	2,846,459,700	2,231,016,700	187,600,000	468,089,400	. . . . .	5,357,965,800	14,679,400	41.09	16.34	40.
1882	3,935,490,600	1,358,543,700	. . . . .	. . . . .	357,334,700	4,936,699,600	13,525,200	40.29	15.05	37.
1883	4,731,227,700	162,361,800	1,245,100,000	. . . . .	334,400,000	3,314,089,500	9,079,700	31.20	10.11	32.
1884	4,533,156,450	1,842,837,100	1,416,300,000	1,340,436,700	. . . . .	6,300,130,250	17,213,450	45.57	19.21	42.
1885	4,091,674,900	1,006,622,800	. . . . .	8,594,800	. . . . .	5,106,892,500	13,991,500	43.66	15.57	36.
1886	4,432,536,100	3,116,283,200	. . . . .	. . . . .	360,662,000	7,188,157,300	19,693,600	46.97	21.92	47.
1887	4,802,120,700	3,658,652,900	. . . . .	. . . . .	763,205,000	7,697,568,600	21,089,200	41.58	23.47	56.

[1] Observations of rainfall at Lake Cochituate commenced 1852, and these observations are assumed as correct for the whole district.
[2] Lake raised two feet.

TABLE III. — *Concluded.*

Statement showing Amount of Water drawn from Lake Cochituate; Amount wasted; Amount of Rainfall collected in Lake; Amount received into Lake from Sudbury River; Percentage of Rainfall collected, etc., 1852 to 1895; Water-shed of Lake, 12,077 Acres.

YEAR.	Amount of Water drawn from Lake.	Amount of Water wasted from Lake.	Amount received into Lake from Sudbury River.	STORAGE.		Total Amount of Rainfall collected in Lake.	Daily average amount of Rainfall collected in Lake.	Rainfall.	Rainfall collected.	Percentage of Rainfall collected.
				Gain.	Loss.					
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Inches.*	*Inches.*	*Per cent.*
1888	4,968,503,100	4,229,200,000	. . . . .	959,309,000	. . . . .	10,157,012,100	27,751,400	56.93	30.97	54.
1889	5,570,423,600	3,373,929,000	233,400,000	454,766,800	. . . . .	9,165,719,400	25,111,600	50.23	27.95	56.
1890	5,722,170,800	2,380,441,200	. . . . .	. . . . .	64,166,300	8,038,445,700	22,023,100	51.23	24.51	48.
1891	5,508,178,900	6,064,000,000	. . . . .	. . . . .	1,056,057,800	10,516,121,100	28,811,300	46.42	32.07	69.
1892	5,464,791,300	281,000,000	902,300,000	200,284,300	. . . . .	5,033,775,600	13,753,500	39.04	15.35	39.
1893	5,623,532,500	255,300,000	. . . . .	. . . . .	89,200,000	5,789,632,500	15,862,000	45.28	17.65	39.
1894	5,520,092,100	None.	962,200,000	. . . . .	296,900,000	4,260,992,100	11,674,000	39.08	12.99	33.
1895	5,654,765,700	657,600,000	896,800,000	1,200,400,000	. . . . .	6,615,965,700	18,125,934	48.96	20.17	41.
Averages . .	5,252,613,300	2,245,199,000	. . . . .	. . . . .	. . . . .	7,111,359,300	13,471,800	47.54	21.63	45.

TABLE IV.

Statement showing Amount of Water diverted from Sudbury River to Lake Cochituate and Chestnut Hill Reservoir; Amount wasted, Amount of Flow in River; Percentage of Rainfall collected, etc., 1875 to 1895.

(Water-shed from 1875 to 1878, inclusive, = 77.764 sq. miles; in 1879 and 1880 = 78.238 sq. miles; and from 1881 to 1893, inclusive, = 75.2 sq. miles.)

Year.	Amount of Water diverted to Lake Cochituate and Chestnut Hill Reservoir.	Amount of Water used by Framingham Water Co.	Amount of Water wasted from River.	Storage.		Total Amount of Flow in River.	Daily average Amount of Flow in River.	Rainfall.	Rainfall collected.	Percentage of Rainfall collected.
				Gain.	Loss.					
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Inches.*	*Inches.*	*Per cent.*
1875	2,555,800,000	. . . . .	24,971,600,000	66,300,000	. . . . .	27,593,700,000	75,599,200	45.490	20.418	44.88
1876	2,528,300,000	. . . . .	29,942,300,000	. . . . .	160,700,000	32,309,900,000	88,278,400	49.563	23.908	48.24
1877	1,894,350,000	. . . . .	32,438,300,000	112,100,000	. . . . .	34,444,750,000	94,369,200	44.018	25.847	57.90
1878	3,422,100,000	. . . . .	37,125,200,000	654,700,000	. . . . .	41,202,000,000	112,882,200	57.931	30.487	52.63
1879	3,749,200,000	. . . . .	20,817,500,000	962,200,000	. . . . .	25,528,900,000	69,942,200	41.419	18.775	45.33
1880	6,230,200,000	. . . . .	11,290,000,000	. . . . .	958,600,000	16,561,600,000	42,250,300	38.177	12.182	31.91
1881	8,845,300,000	. . . . .	17,279,000,000	751,700,000	. . . . .	26,876,000,000	73,633,900	44.160	20.565	46.56
1882	7,735,200,000	. . . . .	16,273,900,000	. . . . .	352,600,000	23,656,600,000	64,812,300	39.394	18.102	45.95
1883	8,455,000,000	. . . . .	7,251,900,000	. . . . .	1,086,400,000	14,620,500,000	40,056,200	32.780	11.188	34.13
1884	6,110,600,000	. . . . .	23,228,900,000	1,744,600,000	. . . . .	31,084,100,000	84,929,200	47.135	23.784	50.46
1885	5,224,700,000	61,800,000	19,878,800,000	. . . . .	446,900,000	24,718,400,000	67,721,600	43.545	18.916	43.44
1886	5,266,600,000	76,600,000	23,023,000,000	1,464,500,000	. . . . .	29,831,700,000	81,730,700	46.065	22.825	49.55
1887	6,124,100,000	87,500,000	25,334,500,000	117,400,000	. . . . .	31,663,500,000	86,749,300	42.705	24.227	56.73
1888	7,224,700,000	61,500,000	39,040,500,000	390,600,000	. . . . .	46,717,300,000	127,642,900	57.465	35.749	62.21

TABLE IV.—*Concluded.*

Statement showing Amount of Water diverted from Sudbury River to Lake Cochituate and Chestnut Hill Reservoir; Amount wasted; Amount of Flow in River; Percentage of Rainfall collected, etc., 1875 to 1895.

(Water-shed from 1875 to 1878 inclusive, = 77.764 sq. miles; in 1879 and 1880 = 78.238 sq. miles; and from 1881 to 1893, inclusive, = 75.2 sq. miles.)

Year.	Amount of Water diverted to Lake Cochituate and Chestnut Hill Reservoir.	Amount of Water used by Framingham Water Co.	Amount of Water wasted from River.	Storage.		Total Amount of Flow in River.	Daily average Amount of Flow in River.	Rainfall.	Rainfall collected.	Percentage of Rainfall collected.
				Gain.	Loss.					
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Inches.*	*Inches.*	*Per cent.*
1889	6,363,900,000	59,500,000	31,550,400,000	. . . . .	2,800,000	37,971,000,000	104,030,100	49.95	29.056	58.17
1890	6,596,000,000	74,500,000	28,667,100,000	. . . . .	57,400,000	35,280,200,000	96,658,100	53.00	26.998	50.94
1891	8,306,600,000	80,500,000	28,799,600,000	. . . . .	1,100,800,000	36,085,900,000	98,865,500	49.52	27.612	55.76
1892	10,535,500,000	82,800,000	11,143,000,000	. . . . .	257,700,000	21,503,600,000	58,753,000	41.83	16.456	39.34
1893	11,737,900,000	103,000,000	17,405,500,000	. . . . .	789,800,000	28,456,600,000	77,963,300	48.225	21.774	45.15
1894	12,412,800,000	117,000,000	6,715,900,000	1,901,600,000	. . . . .	21,147,300,000	57,937,800	39.740	16.182	40.72
1895	13,805,300,000	132,200,000	15,545,600,000	1,137,920,000	. . . . .	31,621,000,000	86,632,900	50.62	24.196	47.80
Averages,	6,910,721,400	85,172,700	22,272,366,700	. . . . .	. . . . .	29,470,078,600	78,220 000	45.845	22.328	47.99

TABLE V.

Statement showing Amount of Water drawn from Mystic Lake; Amount wasted; Amount of Rainfall collected in Lake; Percentage of Rainfall collected, etc., 1876 to 1895; Water-shed of Lake, 17,200 Acres.

Year.	Amount of Water drawn from Lake.	Amount of Water wasted from Lake.	Storage.		Total Amount of Rainfall collected in Lake.	Daily average amount of Rainfall collected in Lake.	Rainfall.	Rainfall collected.	Percentage of Rainfall collected.
			Gain.	Loss.					
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Gallons.*	*Inches.*	*Inches.*	*Per cent.*
1876	3,230,101,300	6,369,774,700	.....	32,583,000	9,567,293,000	26,140,100	47.00	20.49	43.6
1877	3,069,554,800	7,250,223,500	.....	16,291,400	10,303,486,900	28,228,700	43.095	22.06	51.2
1878	3,367,490,400	8,718,547,600	.....	26,000,000	12,060,038,000	33,041,200	54.065	25.82	47.8
1879	3,490,848,200	4,625,691,800	.....	203,000,000	7,913,540,000	21,680,900	35.30	16.94	48.0
1880	3,692,195,700	2,158,761,200	.....	113,500,000	5,703,756,900	15,584,000	34.42	12.21	35.5
1881	2,815,579,900	5,534,300,000	371,200,000	.....	8,721,079,900	23,893,400	41.91	18.67	44.5
1882	2,570,896,700	4,444,668,000	15,000,000	.....	7,030,564,700	19,261,800	39.165	15.05	38.4
1883	2,664,514,200	2,034,702,600	.....	347,579,000	4,351,637,800	11,922,300	31.22	9.32	29.84
1884	2,469,761,000	6,574,003,800	380,600,000	.....	9,424,364,800	25,749,600	44.39	20.18	45.46
1885	2,639,278,800	5,558,860,500	.....	33,200,000	8,194,939,300	22,451,900	44.50	17.55	39.43
1886	2,862,947,500	7,743,258,900	.....	28,400,000	10,577,806,400	28,980,300	45.56	22.65	49.71
1887	2,954,257,500	7,414,213,000	.....	11,000,000	10,357,470,500	28,376,600	46.42	22.17	47.77
1888	3,205,121,100	11,334,593,100	.....	6,000,000	14,533,714,200	39,709,600	56.745	31.12	54.84
1889	3,007,539,800	8,879,787,500	12,000,000	.....	11,899,327,300	32,600,900	50.395	25.48	50.56
1890	3,212,284,500	8,953,727,900	.....	3,000,000	12,163,012,400	33,323,300	49.37	26.04	52.75
1891	3,500,817,500	10,027,714,400	.....	171,000,000	13,357,531,900	36,600,000	47.40	28.60	60.34
1892	3,811,766,200	3,474,213,200	177,000,000	.....	7,462,979,400	20,390,700	39.115	15.98	40.85
1893	4,331,743,200	4,958,528,500	.....	95,000,000	9,195,271,700	25,192,500	44.20	19.69	44.54
1894	3,996,805,100	2,752,964,200	.....	23,000,000	6,726,769,300	18,429,500	39.24	14.40	36.70
1895	3,455,460,300	4,528,156,200	156,000,000	.....	8,139,616,500	22,300,300	48.73	17.42	35.76
Averages	3,217,448,200	6,168,334,500	.....	.....	9,384,210,000	25,692,700	44.11	20.09	44.88

TABLE VI.

Average Maximum and Minimum Monthly and Yearly Heights, in Feet, above Tide Marsh Level, to which Water would rise at different Stations on the Boston Water Works.

1895.	Boston Common.		Engine-house No. 8, Salem street.		Engine-house No. 7, East street.		Engine-house No. 38, Congress street, So. Boston.		Engine-house No. 2, Fourth street, So. Boston.		Engine-house No. 9, Paris street, East Boston.		Engine-house No. 16, River street, Dorchester.		Engine-house No. 32, Bunker Hill street, Charlestown, Mystic supply.		710 Albany street.		City Hall High service.		Engine-house No. 18, Harvard street, Dorchester High service.		Engine-house No. 24, Warren street, Roxbury High service.	
Month.	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*	*Max.*	*Min.*
January .	118.0	95.6	112.9	92.5	112.5	95.3	111.1	92.9	112.5	89.4	99.5	70.6	112.2	93.2	107.3	83.1	113.8	97.4	212.3	194.9	211.4	193.5	215.2	201.0
February .	109.3	93.2	. .	. .	104.1	87.4	104.1	84.9	101.2	80.2	91.4	65.5	107.9	90.5	106.7 136.1	86.1 119.2	110.4	95.0	211.7	195.0	209.4	191.8	209.5	195.1
March . .	113.9	95.0	112.3	90.5	109.4	89.1	112.5	91.1	111.1	87.3	102.5	70.9	111.3	90.8	110.3	83.3	114.4	97.4	215.1	197.6	215.1	196.7	214.3	200.0
April . . .	117.0	97.0	116.9	94.7	112.3	85.0	115.8	93.1	115.2	89.8	108.4	74.4	114.9	92.3	114.7	86.9	117.3	99.2	217.1	196.3	218.0	196.5	218.4	201.3
May . . .	118.2	97.9	118.0	95.3	113.5	95.4	116.6	92.3	116.0	88.5	109.9	71.7	116.3	90.3	111.4 [1]142.8	83.4 122.2	118.6	99.8	220.6	191.1	216.5	189.2	218.3	195.0
June . . .	118.3	97.8	118.4	92.3	114.2	93.2	117.2	92.3	116.0	87.1	110.8	75.6	115.3	85.8	[1]143.7	124.0	118.3	98.3	216.1	189.4	213.1	179.4	215.0	189.7
July . . .	118.3	99.1	117.3	96.8	113.5	94.9	117.5	96.9	116.2	93.3	109.7	74.2	115.8	90.3	114.9 [1]144.1	85.8 127.2	118.7	100.4	218.7	195.5	215.6	188.2	215.7	195.6
August . .	117.7	96.4	117.1	94.5	112.3	90.5	116.5	95.2	114.8	90.3	108.4	71.1	115.3	87.7	114.0	84.2	118.1	98.6	215.0	193.3	213.2	181.2	213.7	193.3
September,	118.0	98.0	117.4	92.1	113.0	92.7	117.1	95.3	115.1	91.5	107.6	71.4	115.5	89.3	114.3	87.6	118.4	99.3	212.2	189.4	210.7	176.7	211.9	189.3
October .	117.5	98.1	117.8	96.5	114.0	93.7	117.6	98.0	115.6	93.5	110.5	76.4	116.0	92.3	114.8	87.4	118.2	99.4	211.6 [2]240.0	189.3 [2]204.0	211.2 [2]229.4	177.3 [2]189.5	212.6 [2]234.4	187.8 [2]192.2
November,	117.4	98.9	117.4	95.8	113.8	94.9	117.5	99.3	115.5	94.8	110.4	78.0	114.3	92.8	114.7	88.4	118.4	99.6	213.3 [2]238.4	180.0 [2]208.9	214.0 [2]228.4	190.0 [2]192.0	215.3 [2]234.4	195.3 [2]202.0
December,	114.4	96.0	114.4	93.1	111.2	93.1	115.3	97.8	111.9	91.3	106.7	76.3	110.9	87.9	110.4	85.6	115.3	94.4	211.4 [2]237.2	189.0 [2]213.7	210.4 [2]230.7	185.7 [2]198.6	211.7 [2]230.0	191.1 [2]205.4
Averages,	116.5	96.9	116.3	94.0	111.9	92.1	114.9	94.1	113.4	89.7	106.3	73.0	113.8	90.3	. . .	. . .	116.6	98.2	. . .	. .	. .	. .	. .	. .

[1] During portions of May, June, July, Charlestown was supplied from the Mystic Supply.
[2] New 48-inch main in service.

TABLE VII.

Statement of Operations of Engines 1 and 2 at the Chestnut Hill Pumping-Station for 1895.

1895.	Engine No. 1.			Engine No. 2.			Total amount pumped, 2% allowed for slip.	Daily average amount pumped.	Total amount of coal consumed.	Daily average amount of coal consumed.	Total ashes and clinkers.	Per cent. ashes and clinkers.	Quantity pumped per lb. of coal. No correction for heating or lighting.	Quantity pumped per lb. of coal. Corrected for heating and lighting.	Average lift in feet.	Division of Coal.			Duty in Ft.-Lbs. per 100 lbs. of coal.		Water evaporated in boilers per lb. of coal.	
	Total pumping time.		Amount pumped.	Total pumping time.		Amount pumped.										Heating.	Lighting.	Pumping.	Without correction for heating and lighting.	Corrected for heating and lighting.	Actual.	From and at 212° F., including feed-water heater.
Month.	*Hrs.*	*Min.*	*Gallons.*	*Hrs.*	*Min.*	*Gallons.*	*Gallons.*	*Gallons.*	*Lbs.*	*Lbs.*	*Lbs.*	*Per cent.*	*Gals.*	*Gals.*	*Ft.*	*Lbs.*	*Lbs.*	*Lbs.*	*Ft.-lbs.*	*Ft.-lbs.*	*Lbs.*	*Lbs.*
January .	355	50	151,821,750	419	05	175,879,000	327,700,750	10,501,000	451,537	14,566	35,370	7.8	725.7	824.7	125.90	27,229	26,942	397,366	76,203,800	86,592,100	9.37	11.07
February,	450	42	196,706,000	267	15	114,778,600	311,484,600	11,124,500	415,592	14,843	34,453	8.3	749.5	833.7	121.12	25,453	16,500	373,639	75,709,700	84,210,500	9.15	10.84
March . .	228	05	97,681,875	472	20	208,815,750	306,497,625	9,887,000	417,205	13,458	34,151	8.2	734.8	806.5	121.11	22,188	14,983	380,034	74,205,100	81,461,200	9.27	10.94
April . .	583	10	250,460,960	26	20	10,788,150	261,249,050	8,708,300	346,618	11,554	36,026	10.4	753.7	819.6	122.01	10,459	17,400	318,759	76,694,600	83,397,600	8.82	10.37
May . . .	296	20	138,703,100	250	20	106,385,850	245,088,950	8,753,200	328,020	10,581	37,020	11.3	747.2	782.0	122.85	. . .	14,592	313,428	76,553,400	80,117,500	9.17	10.69
June . .	111	20	43,208,650	20	45	7,827,825	51,036,475	10,207,300	56,424	11,285	5,396	9.6	904.5	. . .	120.0	. . .	. . .	. . .	90,524,100			
July . . .	200	45	72,033,100	90	20	28,598,775	100,631,875	10,063,200	111,583	11,158	10,332	9.2	901.9	. . .	120.04	. . .	. . .	. . .	90,287,900			
August .	170	40	62,891,050	65	00	22,594,050	85,485,100	10,685,600	88,825	12,689	7,652	8.6	962.4	. . .	119.91	. . .	. . .	. . .	96,244,700			
Septem'er,	719	40	269,721,500	239	50	88,901,200	358,622,700	11,954,100	396,435	13,214	38,468	9.7	904.6	. . .	119.98	. . .	. . .	. . .	90,519,200			
October .	727	25	274,591,900	240	10	88,706,500	363,298,400	11,719,300	432,224	13,943	41,966	9.7	840.5	. . .	120.74	. . .	. . .	. . .	84,639,300			
Novemb'r,	454	10	166,109,780	171	00	58,631,250	224,741,030	10,702,000	282,757	12,761	28,194	10.0	794.9	. . .	120.15	. . .	. . .	. . .	79,645,100			
December,	43	05	15,303,125	22	00	7,311,575	22,614,700	7,538,200	36,255	12,085	3,324	9.2	623.8	. . .	120.31	. . .	. . .	. . .	62,587,960			
Totals and averages,	4,341	12	1,739,232,730	2,285	35	919,218,525	2,658,451,255	10,384,600	3,363,475	13,139	312,352	9.3	790.4	. . .	121.18	. . .	. . .	. . .	79,879,750			

TABLE VII.

Statement of Operations at the Chestnut Hill Pumping-Station for 1895. — (Concluded.)

1895.	Engine No. 3.											Summary. Engines 1, 2, and 3.		
	Total pumping time.		Amount pumped.	Daily average.	Amount of coal consumed	Daily average amount.	Amount of ashes and clinkers	Per ct. of ashes and clinkers	Amount pumped per lb. of coal.	Aver'ge lift of water.	Duty in ft.-lbs. per 100 lbs. of coal.	Total amount pumped.	Daily average amount.	Remarks.
Month.	*Hrs.*	*Min*	*Gallons.*	*Gallons.*	*Lbs.*	*Lbs.*	*Lbs.*	*Per cent.*	*Galls.*	*Feet.*		*Gallons.*	*Gallons.*	
January .	17	00	16,128,150	2,688,000	30,265	5,000	3,400	11.2	532.9	124.0	55,110,200	343,828,900	11,091,300	
February .	22	30	16,326,225	2,332,300	30,255	4,300	4,780	15.8	539.6	124.44	56,003,430	327,810,800	11,707,500	
March . .	32	40	28,075,350	4,010,800	36,623	5,200	5,240	14.3	766.6	125.46	80,212,700	334,573,000	10,792,700	
April . . .	67	47	53,523,270	3,148,400	84,040	4,900	12,690	15.1	636.9	131.04	69,602,800	314,772,300	10,492,400	
May . .	125	51	102,843,280	7,345,950	95,733	6,800	14,230	14.9	1,074.3	124.0	111,096,900	347,932,200	10,901,000	
June . . .	336	22	289,437,400	11,132,200	236,394	9,150	30,732	13.0	1,224.8	123.73	126,345,400	340,473,900	11,349,100	
July . . .	274	55	238,614,900	10,846,100	214,656	9,800	22,825	10.6	1,111.6	124.15	115,097,900	339,246,800	10,943,400	
August . .	307	37	268,589,300	11,191,200	250,029	10,400	27,598	11.0	1,074.2	125.14	112,114,200	354,074,400	11,421,800	
September	. . .	. .	. . . . .	. . . . .	. . . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . .	358,622,700	11,954,100	Engine No. 3 was idle.
October . .	. . .	. .	. . . . .	. . . . .	. . . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . .	363,298,400	11,719,300	Engine No. 3 was idle.
November	153	22	136,024,500	11,335,400	148,095	12,300	18,060	12.2	918.5	125.84	96,396,600	360,765,530	12,025,500	
December	455	12	357,775,900	12,337,100	377,251	13,000	48,396	12.8	948.4	124.68	98,615,200	380,390,600	12,270,700	
Totals & averages	1,793	16	1,507,338,275	9,191,100	1,503,331	9,200	187,951	12.5	1,002.6	125.25	104,737,000	4,165,789,530	11,413,100	

TABLE VIII.

Statement of Operations at the Mystic Pumping-Station for 1895.

1895.	Engine No. 1.			Engine No. 2.			Engine No. 3.			Engine No. 4.			Total amount pumped.	Daily average amount pumped.	Total amount of coal consumed.	Daily average amount of coal.	Total ashes and clinkers.	Per cent. ashes and clinkers.	Quantity pumped per pound of coal.
	Total pumping time.		Amount pumped.	Total pumping time.		Amount pumped.	Total pumping time.		Amount pumped.	Total pumping time.		Amount pumped.							
Month.	*Hrs.*	*Min.*	*Gallons.*	*Hrs.*	*Min.*	*Gallons.*	*Hrs.*	*Min.*	*Gallons.*	*Hrs.*	*Min.*	*Gallons.*	*Gallons.*	*Gallons.*	*Lbs.*	*Lbs.*	*Lbs.*	*Per ct.*	*Gals.*
January . . .	727	15	163,276,300	646	30	132,789,400	. . .	. . .	. . . . .	. .	. .	. . . . .	296,065,700	9,550,500	801,000	25,839	85,385	10.7	369.6
February . .	369	00	81,373,900	456	30	98,270,800	539	30	183,654,400	. .	. .	. . . . .	363,299,100	12,975,000	954,500	34,089	92,476	9.7	380.6
March	59	00	13,001,100	. . .	. .	. . . . .	739	15	257,177,600	. .	. .	. . . . .	270,178,700	8,715,400	656,500	21,177	71,322	10.9	411.5
April	122	30	29,580,900	72	45	15,704,000	572	30	197,785,600	. .	. .	. . . . .	243,070,500	8,102,400	567,000	18,900	62,089	10.9	428.7
May	506	00	115,545,200	103	00	23,978,800	454	15	152,755,200	. .	. .	. . . . .	292,279,200	9,428,400	691,500	22,306	76,732	11.1	422.7
June	512	00	107,980,100	. . .	. .	. . . . .	720	00	236,774,400	. .	. .	. . . . .	344,754,500	11,491,800	780,500	26,016	85,865	11.0	441.7
July	383	30	85,103,600	114	00	24,462,000	528	45	177,996,800	. .	. .	. . . . .	287,562,400	9,276,200	685,500	22,113	72,316	10.5	419.5
August . . .	43	45	10,479,400	. . .	. .	. . . . .	702	45	236,620,800	11	30	3,755,300	250,855,500	8,092,100	561,500	18,113	61,296	10.9	446.8
September .	249	00	54,511,000	. . .	. .	. . . . .	676	15	230,886,400	36	15	13,608,600	299,006,000	9,966,900	676,000	22,533	79,343	11.7	442.3
October . . .	145	00	32,193,200	. . .	. .	. . . . .	602	30	209,664,000	58	30	26,613,000	268,470,200	8,660,300	606,500	19,564	72,224	11.9	442.6
November .	6	15	3,110,600	. . .	. .	. . . . .	634	45	216,875,500	76	00	32,905,300	252,891,400	8,429,700	545,000	18,166	59,823	10.9	464.0
December . .	116	45	24,568,000	. . .	. .	. . . . .	506	10	175,999,500	197	45	86,822,000	287,389,500	9,270,600	595,500	19,209	65,445	10.9	504.6
Totals and averages.	3,240	00	720,723,300	1,392	45	295,205,000	6,676	40	2,276,190,200	380	00	163,704,200	3,455,822,700	9,468,000	8,121,000	22,249	884,316	10.9	425.5

TABLE IX.

Statement of Operations at the East Boston Pumping-Station for the Year 1895.

1895.	Engines Nos. 1 and 2.				Engine No. 3.				Total amount of coal consumed.	Per cent. of ashes and clinkers.
	Total pumping time.		Total amount pumped to reservoir.	Daily average.	Total pumping time.		Total amount pumped to tank.	Daily average.		
Month.	*Hrs.*	*M.*	*Gallons.*	*Gallons.*	*Hrs.*	*M.*	*Gallons.*	*Gallons.*	*Lbs.*	*Per ct.*
Jan. .	373	15	14,869,540	479,700	54	25	844,020	27,200	43,900	19.1
Feb. .	410	50	17,078,320	609,900	68	45	1,035,420	37,000	48,750	18.9
March,	374	05	15,328,600	494,500	53	10	816,000	26,300	43,540	18.8
April .	322	50	13,316,800	443,900	53	25	770,160	25,700	36,380	17.8
May .	345	00	14,254,520	459,900	68	15	961,020	31,000	36,150	18.1
June .	334	05	13,663,580	455,500	88	15	1,315,440	43,800	36,100	18.0
July .	336	15	13,821,500	445,900	95	00	1,407,780	45,400	36,630	18.1
Aug. .	334	45	13,868,820	447,400	105	45	1,594,260	51,400	37,700	18.0
Sept. .	296	15	12,116,440	403,900	96	20	1,443,300	48,100	35,200	18.3
Oct. .	329	30	13,653,920	440,400	91	15	1,288,440	41,600	35,700	18.2
Nov. .	325	00	13,011,880	433,700	88	45	1,169,520	39,000	34,870	18.0
Dec. .	355	25	14,915,460	481,100	116	35	1,693,020	54,600	43,600	18.3
Totals,	4,137	15	169,899,380	465,500	979	55	14,338,380	39,300	468,520	18.4

Engines Nos. 1 and 2 pump to the reservoir.
Engine No. 3 pumps to the tank on Breed's Island.

TABLE X.

Statement of Operations at the West Roxbury Pumping-Station for the Year 1895.

1895.	Total pumping time.		Total amount pumped.	Daily average amount pumped.	Quantity pumped per lb. of coal.	Total amount of coal consumed.	Per cent. of ashes and clinkers.	Average lift.
Month.	*Hours.*	*Min.*	*Gallons.*	*Gallons.*	*Gallons.*	*Lbs.*	*Per cent.*	*Feet.*
January . .	390	30	4,611,675	148,700	145.5	31,700	18.6	135.39
February .	410	30	4,783,275	170,800	157.5	30,375	17.1	134.07
March . . .	399	30	4,706,400	151,800	152.6	30,850	17.3	134.83
April . . .	357	00	4,270,200	142,300	162.1	26,350	16.3	136.60
May	395	00	5,019,825	161,900	172.1	29,175	17.4	136.57
June. . . .	583	00	6,465,600	215,500	162.8	39,425	20.4	138.88
July	446	30	5,617,950	181,200	166.1	33,825	18.2	138.60
August . .	494	30	6,344,175	204,700	162.7	39,000	18.4	138.09
September .	471	30	6,169,950	205,700	161.0	38,325	19.4	142.52
October . .	440	00	5,783,475	186,600	155.9	37,100	18.4	148.53
November .	410	00	5,540,250	184,700	165.6	33,450	16.8	142.67
December .	462	00	6,102,975	196,900	157.1	38,850	17.3	140.83
Totals and Averages.	5,260	00	65,415,750	179 200	160.2	408,425	18.1	138.97

TABLE XI.

Table showing Work done at the Mystic Sewage Pumping-Station during the year 1895.

1895.	Pumping time.		Amount of sewage pumped and treated.	Sulphate aluminum used.	Coal used.	Daily average amount of sewage pumped and treated.
	Hrs.	*Min.*	*Gallons.*	*Lbs.*	*Lbs.*	*Gallons.*
January	543	05	13,289,800	25,360	32,400	428,700
February	472	55	10,492,100	21,560	28,100	388,600
March	523	00	13,670,000	25,740	32,500	441,000
April	474	45	10,254,800	20,470	28,300	353,600
May	464	05	9,529,400	20,085	28,200	352,900
June	390	11	7,296,900	17,775	23,500	304,000
July	279	45	5,480,500	12,550	16,200	322,400
Totals	3,147	46	70,013,500	143,540	189,200	376,400

Total number of days engine worked, 186.

Plant turned over to the Metropolitan Sewerage Commission on July 19, 1895.

TABLE XII.

Rainfall in Inches and Hundredths on Sudbury River Water-shed for the Year 1895.

1895.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	...	...	...	...	...	0.35	...	...	...	...	1.18	...
2	...	0.150	0.620	...	...	...	...	0.10	...	...	...	0.30
3	...	...	...	0.370	...	...	...	...	...	...	0.50	...
4	...	0.140	0.110	...	...	...	0.36	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...	...	0.94
6	...	...	0.100	...	...	0.545	0.825	...	...	...	...	...
7	0.585	...	...	...	...	...	...	1.355	...	...	...	...
8	...	1.055	0.835	...	...	...	...	...	...	0.155	...	...
9	0.255	...	...	...	0.045	...	0.51	...	0.69	...	...	...
10	...	...	...	1.320	...	...	...	...	...	...	0.155	...
11	1.065	...	...	...	...	...	...	...	...	...	...	...
12	...	...	0.030	...	...	...	...	0.27	0.56	...	...	...
13	0.065	...	...	...	0.680	0.08	0.46	...	...	...	...	0.01
14	...	...	0.750	2.755	...	...	0.065	...	...	7.995	...	...
15	...	...	...	...	0.560	0.015	...	...	...	0.04	2.465	...
16	0.475	...	0.120	0.095	...	...	0.065	...	...	...	...	...
17	...	...	...	...	...	...	...	...	...	...	0.87	...
18	0.205	...	...	...	0.235	...	...	1.13	0.14	...	...	...
19	...	...	...	...	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	0.12	...	...	0.07	...
21	...	...	...	...	...	...	0.41	...	...	...	0.37	...
22	0.255	0.050	...	0.185	...	0.03	...	...	...	...	...	0.915
23	...	...	...	...	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	0.005	...	...	0.205	...
25	...	...	0.145	0.015	...	0.555	...	...	...	...	0.185	...
26	0.995	...	...	...	0.055	...	...	...	0.335	...	1.805	...
27	...	...	...	0.295	0.315	...	0.13	...	...	...	...	0.41
28	...	...	0.185	...	...	...	...	...	...	0.055	...	...
29	0.160	...	...	...	...	1.115	...	0.28	...	...	...	...
30	...	...	0.085	0.215	...	0.080	2.215	...	0.575	...	...	...
31	...	...	...	...	0.130	...	...	0.89	...	1.255	...	0.775
Totals	4.060	1.395	2.980	5.250	2.020	2.770	5.040	4.150	2.300	9.500	7.805	3.350

Total rainfall during the year, 50.62 inches, being an average of two gauges located at Framingham and Ashland.

TABLE XIII.

Rainfall in Inches and Hundredths at Lake Cochituate for the Year 1895.

1895.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	...	...	...	...	...	...	...	...	...	...	1.14	...
2	...	0.16	0.61	...	...	...	...	0.09	...	...	0.50	0.27
3	...	...	...	0.38	...	...	...	...	...	...	...	...
4	...	0.11	0.10	...	0.08	...	0.32	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...	...	0.83
6	...	...	0.09	...	...	0.37	0.55	...	...	...	...	...
7	0.52	...	...	...	...	...	...	1.67	...	...	...	...
8	...	1.38	0.91	...	0.04	...	...	...	...	0.25	...	...
9	0.20	...	...	1.01	...	...	0.51	...	0.59	...	0.15	...
10	...	...	...	0.16	...	...	...	...	...	...	...	...
11	1.07	...	...	...	...	...	...	...	1.17	...	...	...
12	...	...	0.03	...	0.66	...	...	0.32	...	...	...	...
13	0.07	...	...	...	...	0.14	0.39	...	...	6.95	...	...
14	...	...	0.77	...	...	...	0.18	...	...	...	...	...
15	...	...	...	2.79	0.59	...	...	...	...	0.04	2.37	...
16	0.48	...	0.11	0.04	0.02	...	0.06	...	...	...	...	...
17	...	...	...	...	...	...	...	...	...	...	0.86	...
18	0.19	...	...	...	0.21	...	...	1.09	0.12	...	...	...
19	...	...	...	...	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	0.02	...	...	0.47	...
21	...	0.05	...	...	...	0.03	...	...	...	...	...	...
22	0.26	...	...	0.18	...	...	...	...	...	...	...	0.57
23	...	...	...	...	...	...	...	...	...	...	...	...
24	...	...	...	...	...	0.39	...	...	...	...	0.18	...
25	...	...	0.15	...	...	0.15	...	...	...	...	...	...
26	0.98	...	...	...	0.09	...	...	...	0.30	...	1.79	...
27	...	...	...	0.25	0.17	...	0.13	...	...	0.06	...	0.32
28	...	...	0.26	...	...	0.91	...	...	...	...	...	...
29	0.16	...	0.08	...	...	...	...	0.10	...	...	...	...
30	...	...	...	0.22	...	1.13	2.57	...	0.59	...	...	...
31	...	...	...	...	0.17	...	...	0.67	...	1.13	...	0.72
Totals	3.93	1.70	3.11	5.03	2.03	3.12	4.71	3.96	2.77	8.43	7.46	2.71

Total rainfall during the year, 48.96 inches.

TABLE XIV.

Rainfall in Inches and Hundredths on Mystic Lake Water-shed for the Year 1895.

1895.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	...	...	...	...	...	0.04	0.25	...	...	...	1.405	...
2	...	0.110	0.600	...	...	...	...	0.115	...	...	0.585	0.21
3	...	...	...	0.365	...	...	...	...	...	...	...	...
4	...	0.110	...	...	0.260	0.225	0.18	...	...	...	...	...
5	...	...	0.095	...	...	...	...	...	...	...	...	...
6	...	...	0.095	...	0.585	0.09	0.225	...	...	...	...	0.64
7	0.425	...	...	...	...	...	...	2.55	...	...	...	...
8	...	0.425	0.800	...	...	...	...	...	...	0.265	...	...
9	0.220	...	0.010	0.785	...	...	0.61	...	...	...	...	...
10	...	...	...	0.100	...	...	...	...	...	...	0.16	...
11	0.965	...	...	...	...	...	...	...	...	...	...	...
12	...	...	...	...	...	...	...	0.175	1.305	...	...	...
13	0.095	...	...	...	1.255	0.685	...	...	...	...	...	...
14	...	...	0.790	...	...	...	0.76	...	...	7.025	...	...
15	...	...	...	2.190	0.470	...	...	...	...	0.075	2.210	...
16	0.410	...	0.090	0.060	...	...	...	...	...	...	...	...
17	...	...	...	...	...	...	0.04	...	...	...	0.80	...
18	...	...	...	...	0.22	...	...	1.99	0.085	...	...	...
19	0.150	...	...	...	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	0.025	...	...	0.485	...
21	...	0.010	...	...	...	...	...	...	...	...	0.185	...
22	0.245	...	0.030	0.210	0.035	0.04	0.08	...	...	...	...	0.56
23	...	...	...	...	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	0.01	...	...	0.435	...
25	...	...	0.160	0.065	...	0.40	...	...	0.060	...	...	...
26	0.900	...	0.025	...	0.09	...	...	0.01	0.030	...	0.155	...
27	...	...	...	0.215	...	...	...	...	0.175	0.075	1.245	0.355
28	...	...	0.205	...	0.235	...	0.215	...	...	...	...	...
29	0.125	...	0.060	...	...	...	...	0.045	...	...	...	...
30	...	...	0.040	0.195	...	2.150	1.985	...	0.385	...	...	...
31	...	...	...	...	...	...	...	0.515	...	1.350	...	0.535
Totals	3.535	0.655	3.000	4.185	3.150	3.630	4.345	5.435	2.040	8.790	7.665	2.300

Total rainfall during the year, 48.73 inches, being an average of two gauges, located at Mystic Lake and Mystic Reservoir.

TABLE XV.

Monthly Rainfall in Inches, during 1895, at Various Places in Eastern Massachusetts.

PLACE.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Framingham	3.88	1.45	2.95	5.38	1.94	3.23	5.17	4.00	2.19	10.07	7.94	3.20	51.40
Dam 4, Ashland	4.24	1.34	3.01	5.12	2.10	2.31	4.91	4.30	2.41	8.93	7.67	3.50	49.84
Cordaville	4.06	1.77	2.95	5.33	2.19	3.10	4.63	4.38	2.27	9.38	7.47	3.48	51.01
Lake Cochituate	3.93	1.70	3.11	5.03	2.03	3.12	4.71	3.96	2.77	8.43	7.46	2.71	48.96
Chestuut Hill	3.91	.88	2.91	4.60	2.58	2.21	3.55	3.91	2.15	9.21	7.69	2.33	45.93
Mystic Lake	3.84	.88	3.15	4.46	2.71	3.51	4.66	5.31	2.23	9.24	7.95	1.96	49.90
Winchester	3.23	.43	2.85	3.91	3.59	3.75	4.03	5.56	1.85	8.34	7.38	2.64	47.56
Mystic Pumping-station	3.62	.75	2.85	4.28	2.54	3.14	4.04	5.29	1.53	9.27	7.47	2.17	46.95
Cambridge Observatory	3.85	1.23	2.66	3.58	1.98	2.73	3.35	3.90	2.14	7.10	8.84	2.19	43.55
Waltham, Boston Manufacturing Co.	4.08	1.29	3.01	4.67	2.03	3.67	4.04	4.92	2.55	11.08	6.17	2.61	50.12
Lowell, Locks and Canals Co.	3.30	1.47	2.66	4.57	1.68	2.63	2.66	2.02	2.23	6.67	8.16	2.68	40.73
Average of above eleven places	3.81	1.19	2.92	4.63	2.31	3.04	4.16	4.32	2.21	8.88	7.65	2.67	47.81

TABLE XVI.

Table showing the Temperature of Air and Water at Various Stations on the Water-Works.

1895.	Temperature of Air.						Temperature of Water.	
	Chestnut-Hill Reservoir.			Framingham.			Brookline Reservoir.	Mystic Engine-House.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Mean.	Mean.
January	50.0	2.0	26.3	49.0	-4.0	23.4	37.0	28.2
February	44.5	-8.5	22.4	45.0	-13.0	20.1	36.0	23.8
March	53.5	11.5	34.2	52.0	11.0	32.5	37.0	34.3
April	82.0	24.0	46.1	79.0	22.0	45.1	44.6	47.1
May	94.0	27.5	61.2	92.0	26.0	59.8	59.1	61.2
June	94.0	46.0	69.1	93.0	43.0	67.8	69.4	69.5
July	93.0	48.0	69.1	93.0	44.0	67.1	71.3	70.8
August	92.0	47.5	70.4	87.0	40.0	67.9	72.9	71.2
September	96.0	38.0	65.3	96.0	34.0	63.8	70.0	67.4
October	71.0	21.0	47.4	69.0	22.0	47.0	55.9	48.8
November	73.5	14.5	43.9	73.0	16.0	43.8	46.4	46.2
December	63.0	6.0	33.3	60.0	6.0	33.4	38.1	36.2

Note. — The maximum and minimum air temperatures in above table are the highest and lowest temperatures in any one day of the month. The mean air temperature is the average of the maximum and minimum temperatures of the whole month. The water temperatures are the mean temperatures for the whole month.

TABLE XVII.

Rainfall in Inches on Cochituate Water-shed, 1863 to 1895.

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.	4 months, July–Oct.
1863	4.10	4.38	3.57	11.34	2.66	1.98	14.12	5.61	3.39	4.56	8.54	5.05	69.30	27.68
1864	3.37	0.98	8.44	4.02	2.84	0.58	1.06	3.56	1.52	6.50	5.45	4.28	42.60	12.64
1865	4.99	4.45	5.48	2.18	8.25	0.91	3.10	3.36	1.66	6.99	4.78	3.31	49.46	15.11
1866	1.44	5.80	3.92	1.94	6.46	4.80	13.35	3.98	8.36	3.43	4.52	4.32	62.32	29.12
1867	2.76	5.40	5.65	2.43	6.46	2.95	5.36	12.36	1.08	7.27	2.63	1.90	56.25	26.07
1868	3.70	1.18	2.51	5.61	8.12	2.95	2.16	7.38	7.69	1.19	6.77	0.45	49.71	18.42
1869	3.71	7.07	7.52	2.57	7.59	3.68	2.63	2.34	8.49	9.50	3.26	5.98	64.34	22.96
1870	7.85	4.68	6.04	8 81	3.14	4.05	3.10	2 03	0.64	7.96	4.40	3.19	55.89	13.73
1871	1.31	2.30	5.02	2.29	5.66	5.96	2.20	3.56	1.46	5.38	7.01	3.24	45.39	12.60
1872	1.86	1.37	3.06	1.74	3.24	4.27	5.55	9.76	6.29	3.69	4.22	3.42	48.47	25.29
1873	4.24	2.43	3.98	2.69	3.24	0.38	4.08	7.17	2.62	6.11	4.54	3.95	45.43	19.98
1874	2.96	2.90	1.19	6.36	3.40	4.79	3.16	4.83	1.55	1.04	2.05	1.70	35.93	10.58
1875	2.42	3.15	3.74	3.23	3.56	6.24	3.57	5.53	3.43	4.85	4.83	0.94	45.49	17.38
1876	1.83	4.21	7.43	3.24	2.80	1.60	9.49	2.19	3.98	2.00	6.59	3.13	48.49	17.66
1877	3.19	0.53	7.79	3.24	3.73	2.64	2.77	3.35	0.46	8.14	6.94	1.02	43.80	14.72
1878	5.77	5.93	4.20	5.63	0.83	3.33	3.47	6.94	1.12	5.15	6.09	5.12	53.58	16.68
1879	2.00	3.05	3.90	4.69	1.20	4.14	3.38	6.43	1.74	0.90	2.98	3.60	38.01	12.45
1880	3.07	4.05	2.83	2.94	1.98	1.25	7.00	3.81	1.69	2.95	1.70	2.56	35.83	15.45

1881	5.56	4.43	4.79	1.71	3.18	4.83	2.78	1.13	2.13	2.87	3.85	3.83	41.09	8.91
1882	5.93	3.96	2.76	1.89	4.73	1.87	3.49	1.14	9.20	2.22	0.93	2.17	40.29	16.05
1883	2.88	3.59	1.76	2.27	3.95	1.81	2.88	0.39	1.31	5.16	2.06	3.14	31.20	9.74
1884	4.39	6.04	4.50	3.80	2.92	3.88	4.42	4.49	0.90	2.59	2.33	5.31	45.57	12.40
1885	5.25	3.98	1.09	3.71	3.46	2.96	1.73	7.01	1.63	5.26	5.26	2.32	43.66	15.63
1886	6.53	6.86	3.46	2.00	2.97	1.21	3.30	3.75	3.20	3.16	4.76	5.77	46.97	13.41
1887	5.29	5.34	5.10	4.45	1.02	2.58	3.77	3.70	1.28	2.49	2.76	3.80	41.58	11.24
1888	4.13	3.55	5.60	2.51	4.63	2.07	1.67	6.32	8.81	4.95	7.03	5.66	56.93	21.75
1889	5.46	1.56	2.28	3.19	3.64	3.17	9.10	4.57	4.92	3.85	5.79	2.70	50.23	22.44
1890	2.34	3.21	7.35	2.51	5.31	1.78	2.31	3.34	6.47	10.11	1.24	5.26	51.23	22.23
1891	6.67	5.02	5.49	3.62	1.67	3.78	2.99	4.91	2.12	4.14	2.84	3.17	46.42	14.16
1892	4.78	2.80	4.12	0.78	5.46	3.23	3.47	3.79	2.87	1.42	5.14	1.18	39.04	11.55
1893	2.61	7.26	3.13	3.21	5.45	2.75	2.40	5.86	1.76	3.74	2.08	5.03	45.28	13.76
1894	3.95	3.89	1.16	3.27	3.70	1.61	3.61	2.57	2.27	5.14	3.53	4.38	39.08	13.59
1895	3.93	1.70	3.11	5.03	2.03	3.12	4.71	3.96	2.77	9.57	6.32	2.71	48.96	21.01
Totals	130.27	127.05	141.97	118.90	129.28	97.15	142.18	151.12	108.81	154.28	143.22	113.59	1,557.82	556.39
Averages . . .	3.95	3.85	4.30	3.60	3.92	2.94	4.31	4.58	3.30	4.67	4.34	3.44	47.21	16.86

TABLE XVIII.

Rainfall collected, in Inches, on Cochituate Water-shed, 1863 to 1895.

YEAR.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.	4 months, July-Oct.
1863	1.93	3.11	3.71	4.42	1.44	0.67	2.97	1.51	0.98	1.32	2.65	2.17	26.88	6.78
1864	2.39	1.56	4.05	2.65	1.62	0.49	0.41	0.68	0.49	1.43	1.25	1.33	18.35	3.01
1865	2.15	1.74	4.66	2.70	4.70	0.34	0.46	0.47	0.45	0.70	1.00	1.13	20.50	2.08
1866	0.73	2.84	1.76	1.63	1.29	1.10	1.20	0.64	1.34	0.93	0.99	1.56	16.01	4.11
1867	1.10	5.24	3.50	2.87	2.20	0.65	0.59	2.10	0.31	1.02	1.10	1.12	21.80	4.02
1868	1.22	1.12	3.84	3.48	6.17	1.59	0.45	1.18	1.85	0.95	1.96	1.17	24.98	4.43
1869	1.82	1.84	3.31	2.49	2.20	1.07	0.74	0.58	1.10	2.37	1.30	3.17	21.99	4.79
1870	4.71	3.93	3.38	6.87	1.66	0.97	0.53	0.41	0.86	1.11	0.88	0.77	26.08	2.91
1871	1.03	2.28	2.53	1.58	2.00	0.87	0.43	0.85	0.39	0.69	1.30	1.21	15.16	2.36
1872	1.15	0.93	1.41	3.08	1.10	1.49	0.14	1.32	1.70	1.69	2.00	1.21	17.22	4.85
1873	3.09	1.57	3.89	6.09	2.66	0.45	0.62	1.40	0.78	2.04	1.86	2.68	27.13	4.84
1874	3.55	2.19	1.84	3.19	2.78	1.96	0.95	0.92	0.53	0.52	0.58	0.51	19.52	2.92
1875	0.13	2.92	2.66	3.15	1.39	1.48	0.25	0.62	0.60	1.19	1.96	1.22	17.57	2.66
1876	1.09	1.78	5.19	4.20	1.43	0.51	0.84	0.29	0.88	0.49	1.85	0.99	19.54	2.50
1877	1.20	1.37	6.81	3.24	2.04	0.92	0.65	0.67	0.46	1.16	2.69	1.96	23.17	2.94
1878	3.25	3.97	5.40	2.86	1.66	0.76	0.47	0.84	0.29	0.73	2.07	4.04	26.34	2.33
1879	1.29	2.32	3.30	4.48	1.40	0.77	0.33	0.95	0.61	0.60	0.72	1.04	17.81	2.49
1880	1.47	2.24	1.79	1.57	0.44	0.06	0.33	0.23	0.24	0.49	0.83	0.61	10.30	1.29

1881	1.19	2.23	5.66	1.79	1.26	1.31	0.16	0.09	0.23	0.18	0.84	1.40	16.34	0.66
1882	1.84	3.00	3.67	0.93	1.55	0.62	0.06	0.07	0.97	0.84	0.58	0.92	15.05	1.94
1883	0.84	1.59	2.04	1.66	1.26	0.07	0.02	0.07	0.62	0.59	0.41	0.94	10.11	1.30
1884	1.84	2.86	4.67	4.00	1.39	0.67	0.26	0.61	0.13	0.34	0.62	1.82	19.21	1.34
1885	1.90	2.00	2.21	2.36	1.61	0.43	0.00	0.33	0.25	0.79	2.05	1.64	15.57	1.37
1886	2.28	7.93	3.51	2.52	1.09	0.18	0.25	0.14	0.30	0.42	1.20	2.10	21.92	1.11
1887	4.06	4.34	4.70	3.36	1.35	0.82	0.72	1.33	0.64	0.49	0.70	0.96	23.47	3.18
1888	1.13	2.77	4.76	3.45	2.37	0.53	0.47	0.94	2.31	2.57	4.21	5.46	30.97	6.29
1889	4.50	1.85	2.08	2.17	1.20	1.18	1.63	3.43	1.79	1.91	2.95	3.26	27.95	8.76
1890	1.92	2.04	5.87	2.23	1.85	1.41	0.33	0.46	1.40	3.40	1.49	2.11	24.51	5.59
1891	6.26	6.62	8.03	4.31	0.88	0.77	0.50	0.72	0.76	0.79	0.83	1.60	32.07	2.77
1892	3.18	1.64	3.12	0.90	2.03	0.49	0.33	0.56	0.60	0.57	1.09	0.84	15.35	2.06
1893	0.64	2.55	4.12	2.42	1.83	0.75	0.38	0.77	0.42	1.09	1.00	1.68	17.65	2.66
1894	1.27	1.69	2.55	2.15	0.91	0.45	0.38	0.41	0.46	0.66	0.92	1.14	12.99	1.91
1895	1.58	0.75	3.50	3.35	0.97	0.40	0.55	0.50	0.69	1.97	3.51	2.40	20.17	3.71
Totals	67.73	86.81	123.52	98.15	59.73	26.23	18.40	26.09	25.43	36.04	49.39	56.16	673.68	105.96
Averages . . .	2.05	2.63	3.74	2.97	1.81	0.79	0.56	0.79	0.77	1.09	1.50	1.70	20.41	3.21

TABLE XIX.

Percentage of Rainfall collected on Cochituate Water-shed, 1863 to 1895.

YEAR.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly.	4 months, July-Oct.
1863	47.0	71.0	104.0	39.0	54.0	34.0	21.0	27.0	29.0	29.0	31.0	43.0	38.8	24.5
1864	71.0	159.0	48.0	66.0	57.0	84.0	39.0	19.0	32.0	22.0	23.0	31.0	43.0	23.8
1865	43.0	39.0	85.0	124.0	57.0	37.0	15.0	14.0	27.0	10.0	21.0	34.0	41.4	13.8
1866	51.0	49.0	45.0	84.0	20.0	23.0	9.0	16.0	16.0	27.0	22.0	36.0	25.7	14.1
1867	40.0	97.0	62.0	118.0	34.0	22.0	11.0	17.0	29.0	14.0	42.0	59.0	38.7	15.4
1868	33.0	95.0	153.0	62.0	76.0	54.0	21.0	16.0	24.0	80.0	29.0	261.0	50.2	24.0
1869	49.0	26.0	44.0	97.0	29.0	29.0	28.0	25.0	13.0	25.0	40.0	53.0	34.2	20.9
1870	60.0	84.0	56.0	78.0	53.0	24.0	17.0	20.0	134.0	14.0	20.0	24.0	46.7	21.2
1871	79.0	99.0	50.4	68.8	35.3	14.6	19.6	23.8	26.8	12.8	18.5	37.4	33.4	18.7
1872	61.8	67.8	46.0	177.3	33.8	34.8	2.6	13.5	27.0	45.7	47.4	35.3	35.5	19.2
1873	72.9	64.8	97.8	226.4	82.2	119.1	15.1	19.5	29.8	33.4	40.9	67.9	59.8	24.2
1874	120.0	75.5	154.7	50.2	81.7	40.8	30.0	19.1	34.3	50.3	28.4	29.9	54.3	27.6
1875	5.5	92.8	71.2	97.5	39.9	23.7	7.1	11.2	17.4	24.6	40.5	129.8	38.6	15.3
1876	59.3	42.4	69.9	129.7	50.9	31.6	8.9	13.3	22.2	24.3	28.1	31.5	40.3	14.2
1877	37.6	258.9	87.4	100.0	54.6	34.8	23.3	19.6	99.8	14.3	38.8	192.6	52.9	20.0
1878	56.3	66.9	128.6	50.7	200.0	23.2	13.5	12.0	25.8	14.3	34.0	78.8	49.2	14.0
1879	64.4	76.3	84.5	95.6	117.0	18.6	9.7	14.7	35.0	66.5	24.2	28.9	46.9	20.0
1880	47.9	55.3	63.3	53.3	22.2	4.5	4.7	6.1	14.3	16.6	48.9	23.8	28.7	8.3

1881	21.5	50.3	118.1	104.8	39.6	27.0	5.8	7.6	10.8	6.4	21.8	36.7	39.8	7.4
1882	31.0	75.9	133.0	49.3	32.8	33.1	1.7	6.2	10.5	37.9	62.4	42.3	37.4	12.1
1883	29.2	44.3	115.8	73.1	31.9	3.7	0.6	18.6	47.4	11.5	20.0	29.8	32.4	13.3
1884	41.8	47.4	103.9	105.1	47.5	17.3	5.0	13.6	14.9	13.1	26.7	34.2	42.2	10.8
1885	36.1	50.2	202.7	63.6	46.7	14.4	0.0	4.8	15.5	15.0	39.0	70.7	35.7	8.8
1886	36.6	107.3	101.9	154.3	43.0	35.5	11.1	7.8	10.7	13.4	21.7	29.7	49.7	8.3
1887	60.2	80.8	72.0	81.3	112.0	47.3	13.2	27.1	32.0	18.7	23.4	25.6	47.8	28.3
1888	27.5	78.0	85.0	137.3	51.2	25.8	28.1	14.9	26.2	51.9	59.9	96.4	54.4	28.9
1889	82.5	118.7	91.5	68.1	32.9	37.1	17.9	75.0	36.4	49.6	50.9	120.9	55.6	39.0
1890	82.0	63.4	79.9	88.9	34.9	79.1	14.2	13.9	21.6	33.7	120.0	40.2	47.9	25.1
1891	93.8	131.9	146.3	119.1	52.8	20.4	16.7	14.7	35.9	19.0	29.2	50.5	69.1	19.6
1892	66.6	58.5	75.7	115.5	37.1	15.3	9.5	14.7	21.1	40.2	21.2	71.1	39.3	17.8
1893	24.5	35.1	131.7	75.7	33.5	27.2	15.9	13.2	23.9	28.8	48.4	33.4	39.0	19.3
1894	32.3	43.5	219.7	65.8	24.6	27.9	10.4	16.1	20.0	12.8	26.1	26.1	33.3	14.1
1895	40.1	44.2	112.4	66.5	47.8	13.0	11.8	12.6	25.0	20.6	55.5	88.6	41.2	17.7
Totals	1704.4	2549.2	3240.4	3085.9	1765.9	1076.8	458.3	567.6	988.3	896.4	1203.9	1993.1	1423.1	609.7
Averages . . .	51.65	77.25	98.19	93.51	53.51	32.63	13.89	17.20	29.94	27.16	36.48	60.39	43.12	18.48

TABLE XX.

Rainfall, in Inches, on Sudbury-river Water-shed, 1875 to 1895.

YEAR.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.	4 months, July-Oct.
1875	2.420	3.150	3.740	3.230	3.560	6.240	3.570	5.530	3.430	4.850	4.830	0.940	45.490	17.380
1876	1.830	4.210	7.430	4.197	2.763	2.040	9.134	1.720	4.614	2.241	5.764	3.620	49.563	17.709
1877	3.216	0.739	8.357	3.435	3.702	2.425	2.951	3.682	0.323	8.515	5.803	0.870	44.018	15.471
1878	5.632	5.973	4.689	5.790	0.956	3.884	2.971	6.937	1.291	6.417	7.024	6.367	57.931	17.616
1879	2.478	3.562	5.140	4.716	1.579	3.789	3.933	6.509	1.878	0.809	2.682	4.344	41.419	13.129
1880	3.566	3.980	3.315	3.105	1.836	2.138	6.273	4.008	1.603	3.740	1.785	2.828	38.177	15.624
1881	5.558	4.646	5.730	2.000	3.511	5.395	2.350	1.358	2.617	2.955	4.091	3.958	44.169	9.280
1882	5.951	4.546	2.649	1.824	5.066	1.664	1.769	1.667	8.741	2.074	1.147	2.296	39.394	14.251
1883	2.810	3.865	1.780	1.845	4.185	2.400	2.680	0.735	1.520	5.600	1.810	3.550	32.780	10.535
1884	5.085	6.545	4.720	4.405	3.470	3.445	3.665	4.650	0.855	2.480	2.645	5.170	47.135	11.650
1885	4.710	3.865	1.070	3.605	3.485	2.865	1.425	7.185	1.425	5.095	6.095	2.720	43.545	15.130
1886	6.365	6.280	3.610	2.224	2.995	1.465	3.265	4.100	2.905	3.235	4.645	4.975	46.065	13.505
1887	5.200	4.780	4.900	4.265	1.165	2.650	3.760	5.280	1.320	2.835	2.670	3.880	42.705	13.195
1888	4.150	3.685	6.020	2.425	4.825	2.535	1.405	6.225	8.585	4.990	7.224	5.395	57.465	21.205
1889	5.370	1.655	2.365	3.410	2.945	2.800	8.940	4.175	4.605	4.255	6.290	3.140	49.950	21.975
1890	2.530	3.505	7.735	2.645	5.210	2.030	2.460	3.865	6.000	10.510	1.200	5.310	53.000	22.835
1891	7.020	5.235	6.475	3.905	2.010	3.770	3.395	4.725	2.380	3.830	3.090	3.685	49.520	14.330
1892	5.850	3.140	4.060	0.830	5.585	2.760	4.230	4.440	2.840	1.170	5.800	1.125	41.830	12.680
1893	2.925	8.195	3.670	3.605	6.610	2.380	2.570	5.415	1.735	4.065	2.195	4.860	48.225	13.785
1894	4.090	3.910	1.435	3.415	4.235	1.155	3.255	2.030	2.635	5.345	3.425	4.810	39.740	13.265
1895	4.060	1.395	2.980	5.250	2.020	2.770	5.040	4.150	2.300	10.680	6.625	3.350	50.620	22.170
Totals	90.816	86.861	91.870	70.127	71.713	60.600	79.041	88.386	63.602	95.691	86.841	77.193	962.741	326.720
Averages . . .	4.325	4.136	4.375	3.339	3.415	2.886	3.764	4.209	3.029	4.557	4.135	3.676	45.845	15.558

TABLE XXI.

Rainfall collected, in Inches, on Sudbury-river Water-shed, 1875 to 1895.

YEAR.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.	4 months, July-Oct.
1875	0.184	2.411	2.862	5.263	2.119	1.501	0.573	0.706	0.358	1.152	2.248	1.041	20.418	2.789
1876	1.147	2.282	7.911	5.683	2.031	0.383	0.326	0.723	0.318	0.417	1.878	0.809	23.908	1.784
1877	1.174	1.529	8.586	4.132	2.482	1.031	0.360	0.216	0.103	1.127	2.447	2.300	25.487	1.806
1878	3.228	3.972	6.256	2.807	2.487	0.873	0.229	0.848	0.277	0.921	2.922	5.667	30.487	2.275
1879	1.249	2.756	4.156	5.379	1.987	0.713	0.281	0.705	0.243	0.126	0.355	0.825	18.775	1.355
1880	2.000	2.982	2.451	2.017	0.917	0.303	0.315	0.212	0.138	0.181	0.354	0.312	12.182	0.846
1881	0.740	2.491	7.142	2.669	1.721	2.309	0.493	0.264	0.340	0.331	0.682	1.383	20.565	1.428
1882	2.213	3.872	5.064	1.497	2.304	0.913	0.154	0.099	0.529	0.534	0.362	0.561	18.102	1.316
1883	0.597	1.664	2.873	2.330	1.673	0.518	0.206	0.140	0.157	0.331	0.354	0.345	11.188	0.834
1884	1.775	4.742	6.752	4.925	1.838	0.719	0.399	0.458	0.076	0.148	0.302	1.650	23.784	1.081
1885	2.203	2.182	2.805	3.133	2.383	0.735	0.111	0.429	0.209	0.599	2.033	2.094	18.916	1.348
1886	2.606	7.734	3.672	3.361	1.285	0 350	0.206	0.168	0.203	0.260	1.161	1.819	22.825	0.837
1887	4.619	4.558	5.116	4.522	1.799	0.714	0.204	0.382	0.191	0.339	0.636	1.147	24.227	1.116
1888	1.878	3.255	5.775	4.566	2.912	0.728	0.209	0.677	1.994	3.566	4.761	5.428	35.749	6.446
1889	4.963	1.926	2.388	2.434	1.569	1.128	1.130	2.554	1.422	2.194	3.351	3.997	29.056	7.300
1890	2.237	2.463	6.498	3.236	2.437	0.980	0.191	0.235	0.790	4.053	2.097	1.776	26.993	5.269
1891	5.383	5.616	7.944	4.138	1.039	0.714	0.266	0.290	0.350	0.375	0.526	0.971	27.612	1.281
1892	3.335	1.574	3.488	1.504	2.245	0.739	0.382	0.500	0.396	0.224	1.204	0.865	16.456	1.502
1893	0.773	2.485	5.789	3.668	5.143	0.759	0.282	0.322	0.187	0.395	0.550	1.421	21.774	1.186
1894	1.236	1.596	3.992	2.832	1.498	0.723	0.287	0.373	0.258	0.668	1.442	1.277	16.182	1.586
1895	1.844	0.871	4.299	4.341	1.134	0.301	0.411	0.409	0.153	2.460	4.794	3.179	24.196	3.433
Totals	45.384	62.961	10 5.819	74.437	43.003	17.134	7.015	10.710	8.692	20.401	34.459	38.867	468.882	46.818
Average	2.161	2.998	5.039	3.545	2.048	0.816	0.334	0.510	0.414	0.971	1.641	1.851	22.328	2.229

TABLE XXII.

Percentage of Rainfall collected on Sudbury-river Water-shed, 1875 to 1895.

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly.	4 months, July-Oct.
1875 . . .	7.6	76.5	76.5	162.9	59.5	24.0	16.0	12.8	10.4	23.8	46.5	110.7	44.9	16.0
1876 . . .	62.7	54.2	106.5	135.4	73.5	18.8	3.6	42.0	6.9	18.6	32.6	22.3	48.2	10.1
1877 . . .	36.5	206.9	102.7	120.3	67.0	42.5	12.2	5.9	31.9	13.2	42.2	264.4	57.9	11.7
1878 . . .	57.3	66.5	133.4	48.5	260.2	22.5	7.7	12.2	21.5	14.3	41.6	89.0	52.6	12.9
1879 . . .	50.4	77.4	80.9	114.1	125.8	18.8	7.1	10.8	12.9	15.6	13.2	19.0	45.3	10.3
1880 . . .	56.0	74.9	73.9	65.0	50.0	14.2	5.0	5.3	8.6	4.8	19.9	11.0	31.9	5.4
1881 . . .	13.3	53.6	124.6	133.4	49.0	42.8	21.0	19.4	13.0	11.2	16.7	34.9	46.6	15.4
1882 . . .	37.2	85.2	191.2	82.1	45.5	54.9	8.7	5.9	6.0	25.7	31.5	24.5	45.9	9.2
1883 . . .	21.2	43.0	161.4	126.3	40.0	21.6	7.7	19.1	10.4	5.9	19.5	9.7	34.1	7.9
1884 . . .	34.9	72.5	143.1	111.8	53.0	20.9	10.9	9.8	8.9	6.0	11.4	31.9	50.5	9.3
1885 . . .	46.8	56.4	262.1	86.9	68.4	25.7	7.8	6.0	14.7	11.8	33.3	77.0	43.4	8.9
1886 . . .	40.9	123.2	101.7	151.1	42.9	23.9	6.3	4.1	7.0	8.0	25.0	36.6	49.5	6.2
1887 . . .	88.8	95.3	104.4	106.0	154.5	26.9	5.5	7.2	14.5	12.0	23.8	29.6	56.7	8.5
1888 . . .	45.3	88.3	95.9	188.3	60.3	28.7	14.9	10.9	23.2	71.4	65.9	100.6	62.2	30.4
1889 . . .	92.4	116.4	100.9	71.4	53.3	40.3	12.6	61.2	30.9	51.6	53.3	127.3	58.2	33.2
1890 . . .	88.4	70.3	84.0	122.3	46.8	48.3	7.8	6.1	13.2	38.6	174.7	33.5	50.9	23.1
1891 . . .	76.7	107.3	122.7	106.0	51.7	18.9	7.8	6.1	14.7	9.8	17.0	26.3	55.8	8.9
1892 . . .	57.0	50.1	85.9	181.1	40.2	26.8	9.0	11.3	13.9	19.2	20.7	76.9	39.3	11.8
1893 . . .	26.4	30.3	157.7	101.7	77.8	31.9	11.0	5.9	10.8	9.7	25.1	29.2	45.2	8.6
1894 . . .	30.2	40.8	278.2	82.9	35.4	62.6	8.8	18.4	9.8	12.5	42.1	26.5	40.7	12.0
1895 . . .	45.4	62.5	144.2	82.7	56.1	10.8	8.2	9.9	6.7	23.0	72.4	94.9	47.8	15.5
Totals .	1015.4	1651.6	2731.9	2380.2	1510 9	625.8	199.6	290.3	289.9	406.7	828.4	1275.8	1007.6	275.3
Averages,	48.4	78.6	130.1	113.3	71.9	29.8	9.5	13.8	13.8	19.4	39.4	60.8	.48.0	13.1

TABLE XXIII.

Rainfall, in Inches, on Mystic Water-shed, 1878 to 1895.

YEAR.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.	4 months, July–Oct.
1878	5.67	5.74	3.93	5.73	0.67	2.62	3.52	7.51	3.19	4.95	5.69	4.845	54.065	19.17
1879	1.82	2.73	3.52	4.65	1.86	3.98	2.39	5.48	1.60	0.77	2.76	3.74	35.30	10.24
1880	2.62	4.23	2.49	2.18	2.02	1.49	7.23	3.64	1.42	2.70	1.90	2.50	34.42	14.99
1881	5.82	3.63	6.69	1.54	2.98	6.84	2.60	0.67	2.17	2.16	3.52	3.29	41.91	7.60
1882	5.545	4.68	2.49	2.11	4.58	2.09	2.34	1.065	8.35	1.94	1.745	2.23	39.165	13.695
1883	2.67	3.065	2.22	2.47	3.585	1.635	2.785	0.87	1.495	5.45	1.98	2.995	31.22	10.60
1884	4.745	6.085	4.255	3.18	2.95	4.635	3.72	4.855	0.70	2.70	2.005	4.56	44.39	11.975
1885	4.83	3.40	1.175	3.445	3.945	4.41	2.04	5.90	1.425	5.52	6.31	2.10	44.50	14.885
1886	6.315	7.175	3.84	2.10	2.945	1.54	3.71	3.24	2.955	2.85	4.065	4.825	45.560	12.755
1887	5.245	4.47	5.00	4.605	1.69	2.695	6.585	4.965	1.50	3.04	3.05	3.575	46.42	16.090
1888	4.05	3.28	5.185	2.84	5.095	2.20	2.23	6.23	8.56	4.955	6.85	5.27	56.745	21.975
1889	5.505	1.86	2.285	3.61	4.64	3.315	8.455	3.92	4.705	3.59	5.65	2.86	50.395	20.67
1890	2.725	3.38	6.68	2.405	6.30	3.38	2.265	3.64	3.70	8.84	1.385	4.67	49.37	18.445
1891	6.245	5.075	6.07	3.15	2.46	4.43	3.18	3.88	2.16	4.735	2.605	3.41	47.40	13.955
1892	4.515	3.015	4.005	0.815	5.585	4.15	2.575	4.82	2.005	1.835	4.645	1.15	39.115	11.235
1893	2.26	7.50	2.55	3.37	6.26	2.10	2.04	5.41	2.01	4.10	2.25	4.35	44.20	13.56
1894	3.93	3.31	1.09	3.48	5.18	0.72	3.45	2.52	2.52	5.58	3.49	3.97	39.24	14.07
1895	3.535	0.655	3.00	4.185	3.150	3.630	4.345	5.435	2.040	10.195	6.260	2.300	48.73	22.015
Totals	78.045	73.280	66.475	55.865	65.895	55.860	65.460	74.050	52.505	75.910	66.160	62.640	792.145	267.925
Averages . .	4.336	4.071	3.693	3.104	3.661	3.103	3.637	4.114	2.917	4.217	3.676	3.480	44.008	14.885

TABLE XXIV.

Rainfall collected, in Inches, on Mystic Water-shed, 1878 to 1895.

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.	4 months, July–Oct.
1878	3.55	3.97	4.91	2.21	2.16	0.78	0.48	1.11	0.56	0.71	1.75	3.63	25.82	2.86
1879	1.21	2.33	3.31	3.97	1.95	0.97	0.54	0.70	0.48	0.34	0.45	0.69	16.94	2.06
1880	1.70	2.54	1.95	1.50	0.96	0.51	0.67	0.54	0.45	0.36	0.44	0.59	12.21	2.02
1881	0.82	2.14	6.79	2.17	1.51	2.05	0.87	0.35	0.31	0.29	0.50	0.87	18.67	1.82
1882	1.37	3.03	4.19	1.16	1.85	0.81	0.35	0.22	0.53	0.58	0.39	0.57	15.05	1.68
1883	0.70	1.43	1.88	1.63	1.20	0.52	0.30	0.22	0.18	0.39	0.42	0.44	9.31	1.09
1884	1.49	3.89	5.42	3.85	1.48	0.85	0.58	0.60	0.23	0.27	0.35	1.17	20.18	1.68
1885	1.79	1.81	2.05	2.03	2.18	0.86	0.47	0.54	0.34	0.68	2.41	2.39	17.55	2.03
1886	2.31	7.70	3.91	3.24	1.27	0.55	0.41	0.25	0.32	0.38	0.88	1.43	22.65	1.36
1887	3.16	3.61	3.60	3.75	1.89	1.27	0.87	1.35	0.48	0.57	0.71	0.91	22.17	3.27
1888	1.43	3.32	4.28	3.27	2.88	0.84	0.39	0.54	1.31	2.74	5.04	5.08	31.12	4.98
1889	4.51	1.83	1.60	2.27	2.18	1.89	1.33	2.05	1.06	1.21	2.49	3.06	25.48	5.65
1890	2.07	2.23	5.37	2.93	3.00	1.92	0.43	0.46	0.58	2.61	1.95	2.49	26.04	4.08
1891	6.29	5.97	7.21	3.43	1.40	1.01	0.42	0.44	0.42	0.58	0.56	0.87	28.60	1.86
1892	2.49	1.76	3.03	1.33	2.10	1.17	0.66	0.49	0.56	0.45	1.07	0.87	15.98	2.16
1893	0.75	2.14	4.52	2.72	4.42	1.04	0.47	0.69	0.41	0.55	0.71	1.27	19.69	2.12
1894	1.37	1.87	3.05	2.27	1.31	0.91	0.49	0.38	0.36	0.58	0.91	0.90	14.40	1.81
1895	1.50	0.81	3.12	2.70	1.31	0.50	0.55	0.77	0.32	1.43	2.34	2.08	17.43	3.07
Totals	38.51	52.38	70.19	46.43	35.05	18.45	10.28	11.70	8.90	14.72	23.37	29.31	359.29	45.60
Averages . .	2.14	2.91	3.90	2.58	1.95	1.03	0.57	0.65	0.49	0.82	1.30	1.63	19.96	2.53

TABLE XXV.

Percentage of Waterfall collected at Mystic Water-shed, 1878 to 1895.

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Yearly.	4 months, July-Oct.
1878	62.6	69.2	125.0	38.6	322.9	29.6	13.5	14.8	17.7	14.3	30.8	74.9	47.8	14.9
1879	66.6	85.4	93.9	85.3	104.9	24.5	22.6	12.8	29.7	44.2	16.2	18.6	48.0	20.1
1880	64.9	60.1	78.4	68.8	47.3	34.3	9.2	14.7	31.7	13.5	22.9	23.8	35.5	13.5
1881	14.2	58.9	101.5	141.1	50.7	29.9	33.3	51.9	14.1	13.6	14.3	26.3	44.5	23.9
1882	24.8	64.8	168.4	55.0	40.4	38.6	14.9	20.8	6.3	30.0	22.2	25.5	38.4	12.3
1883	26.1	46.7	84.8	65.9	33.5	31.8	10.8	25.7	12.1	7.2	21.1	14.7	29.8	10.3
1884	31.5	63.9	127.3	121.2	50.2	18.3	15.5	12.4	33.5	9.9	17.4	25.6	45.5	14.0
1885	37.1	53.3	174.5	58.8	55.3	19.6	22.8	9.2	23.7	12.2	38.2	113.6	39.4	13.6
1886	36.6	107.3	101.9	154.3	43.0	35.5	11.1	7.8	10.7	13.4	21.7	29.7	49.7	10.7
1887	60.2	80.8	72.0	81.3	112.0	47.3	13.2	27.1	32.0	18.7	23.4	25.6	47.8	20.3
1888	35.2	101.3	82.5	115.2	56.6	38.1	17.5	8.8	15.3	55.3	73.6	96.4	54.8	22.7
1889	81.8	98.2	70.2	63.0	46.9	57.0	15.8	52.2	22.5	33.7	44.1	107.0	50.6	27.3
1890	75.6	66.0	80.4	121.8	47.6	56.9	19.0	12.7	15.6	29.5	141.2	53.5	52.8	22.1
1891	100.7	117.6	118.7	109.0	57.0	22.8	13.3	11.3	19.3	12.1	21.7	25.6	60.3	13.3
1892	55.0	58.5	75.7	163.6	37.5	28.3	25.7	10.2	27.7	24.3	23.1	75.2	40.9	19.2
1893	33.3	28.6	177.3	80.7	70.6	49.5	23.2	12.6	20.5	13.4	31.5	29.1	44.5	15.6
1894	34.8	56.5	280.1	65.4	25.3	125.8	14.2	15.1	14.3	10.5	26.0	22.7	36.7	12.9
1895	42.4	123.4	103.9	64.7	41.5	13.7	12.8	14.1	15.7	14.0	37.3	90.7	35.8	13.9
Totals . .	883.4	1340.5	2116.5	1653.7	1243.2	701.5	308.4	334.2	362.4	369.8	626.7	878.5	802.8	300.6
Averages .	49.1	74.5	117.6	91.9	69.1	39.0	17.1	18.6	20.1	20.5	34.8	48.8	44.6	16.7

TABLE XXVI.

Yield of Sudbury-river Water-shed, 1875–1895. Area of water-shed used, includes water surfaces.

Year.	Rainfall.	Daily Average Yield for Year.	Yield per Square Mile per Day.	Rainfall, July–Oct.	Daily Average Yield, July–Oct.	Yield per Square Mile per Day.	Minimum Monthly Yield.				Minimum Yield in any Week.		
								Rainfall.	Daily Average Yield for Month.	Yield per Square Mile per Day.		Daily Average Yield for Week.	Yield per Square Mile per Day.
	Inches.	Gallons.	Gallons.	Inches.	Gallons.	Gallons.	Month.	Inches.	Gallons.	Gallons.	Week.	Gallons.	Gallons.
1875	45.490	75,599,200	972,200	17.380	30,650,400	394,100	January . . .	2.420	8,000,000	102,900			
1876	49.563	88,278,400	1,135,200	17.709	19,603,300	252,100	July	9.134	14,229,000	183,000	. . . . .	4,000,000	51,400
1877	44.018	94,369,200	1,213,500	15.471	19,832,100	255,000	September . .	0.323	4,633,300	59,600	. . . . .	1,800,000	23,100
1878	57.931	112,882,200	1,451,600	17.616	25,001,600	321,500	July	2.971	9,983,900	128,400	. . . . .	5,300,000	68 200
1879	41.419	69,942,200	894,000	13.129	14,974,000	191,400	October . . .	0.809	5,532,300	70,700			
1880	38.177	45,250,300	578,400	15.624	9,356,100	119,600	September . .	1.603	6,280,000	80,300			
1881	44.169	73,633,900	979,200	9.280	15,178,900	201,800	August	1.358	11,135,500	148,100			
1882	39.394	64,812,300	861,900	14.251	13,977,200	185,900	August	1.667	4,158,100	55,300	Aug. 20–26	2,604,000	34,600
1883	32.780	40,056,200	532,700	10.535	8,870,700	118,000	August	0.735	5,906,500	78,500			
1884	47.135	84,929,200	1,129,400	11.650	11,487,000	152,800	September . .	0.855	3,303,300	43,900	Sept. 14–20	51,300	700
1885	43.545	67,721,600	900,600	15.130	14,313,000	190,300	July	1.425	4,667,700	62,100			
1886	46.065	81,730,700	1,086,800	13.505	8,891,900	118,200	August	4.100	7,077,400	94,100			
1887	42.705	86,749,300	1,153,600	13.195	11,874,800	157,900	September . .	1.320	8,346,700	111,000	Sept. 18–24	6,162,900	82,000
1888	57.465	127,642,900	1,697,400	21.205	68,478,000	910,600	July	1.405	8,825,800	117,400			

1889	49.950	104,030,100	1,383,400	21.975	77,563,400	1,031,400	July	8.940	47,645,200	633,600			
1890	53.000	96,650,400	1,285,200	22.835	55,975,600	744,400	July	2.460	8,064,500	107,200	July 13-19	3,446,800	45,800
1891	49.520	98,865,500	1,314,700	14.330	13,608,900	181,000	July	3.395	11,212,900	149,100			
1892	41.830	58,753,000	781,300	12.680	15,957,700	212,200	October . . .	1.170	9,461,300	125,800			
1893	48.225	77,963,300	1,036,700	13.785	12,602,400	167,600	September . .	1.735	8,126,700	108,100			
1894	39.740	57,937,800	770,400	13.265	16,856,900	224,200	September . .	2.635	11,243,300	149,500			
1895	50.620	86,632,900	1,152 000	22.170	36,477,200	485,100	September . .	2.300	6,673,300	88,700			
Averages .	45.845	80,687,200	1,073,000	15.559	23,882,400	317,600							

SUMMARY OF STATISTICS.

REPORT FOR 1895.

Boston Water Works, Suffolk County, Massachusetts, supplies also the cities of Somerville, Chelsea, and Everett.

Population by census of 1895:	
Boston	496,920
Chelsea	31,264
Somerville	52,200
Everett	18,573
Total	598,957
Date of construction:	
Cochituate Works	1848
Mystic	1864

By whom owned. — City of Boston.

Sources of supply. — Lake Cochituate, Sudbury river, and Mystic lake.

Mode of supply. — Sixty-five per cent. from gravity works.
Thirty-five " " pumping "

PUMPING.

	COCHITUATE.	MYSTIC.
Builder of pumping machinery	Holly Mfg. Co. and Quintard Iron Works.	H. R. Worthington and G. F. Blake Mfg. Co.
Description of coal used:		
a Kind	Bituminous.	Bituminous.
c Size	Broken.	Broken.
e Price per gross ton, in bins	$4.27, $3.92½, $3.90.	$3.63, $3.59, $3.34.
f Per cent. of ash,	10.2	10.9

	COCHITUATE.	MYSTIC.
Coal consumed for year, in lbs.	4,866,806	8,121,000
Total pumpage for year, in gallons	4,165,789,530	3,455,822,700
Gallons pumped per lb. of coal	855.9	425.5
Cost of pumping figured on pumping-station expenses, viz.:	$31,566.85	$30,569.07
Cost per million gallons raised to reservoir	$7.58	$8.84

CONSUMPTION.

	COCHITUATE.	MYSTIC.
Estimated population . .	487,000	113,700
Estimated number of consumers,	483,500	112,500
Total consumption, gallons .	18,542,416,600	3,455,460,300
Passed through meters . .	4,410,825,000	768,600,000
Percentage metered . . .	23.8	22.2
Average daily consumption, gallons	50,801,100	9,467,000
Gallons per day, each inhabitant	104.3	83.3
Gallons per day, each consumer,	105.0	84.1
Gallons per day to each tap .	716.7	392.5

DISTRIBUTION.

Mains.

	COCHITUATE.	MYSTIC.
Kind of pipe used . .	Cast-Iron.	Cast-Iron, Wrought-Iron, and Cement.
Sizes	48 in. to 4 in.	30 in. to 3 in.
Extended, miles . . .	23.1	4.9
Total now in use . . .	595.9	178.6
Distribution-pipes less than 4 in., length, miles . .	2.2	4.3
Hydrants added . . .	242	97
Hydrants now in use . .	6,459	1,543
Stop-gates added . .	289	147
Stop-gates now in use . .	6,648	2,285

Services.

Kind of pipe used .	Lead.	Lead and Wrought-Iron.
Sizes	$\frac{5}{8}$ in. to 6 in.	$\frac{1}{2}$ in. to 4 in.
Extended, feet . . .	53,192	20,524
Service-taps added . .	2,323	863
Total now in use . .	70,879	24,120
Meters added . . .	61	10
Meters now in use . .	4,398	504
Motors and elevators in use .	512	21

C.

IMPROVED SEWERAGE.

The work of extending the Improved Sewerage System has been continued as fast as the limited appropriation would admit, and the following is a brief review of the work done during the past year:

The condition of the appropriation on February 1, 1896, was as follows:

Net appropriation	$6,375,404 96
Total expenditures	6,341,262 08
Unexpended balance February 1, 1896 .	$34,142 88

The following is a report of the work done:

DORCHESTER INTERCEPTING SEWER.

During the past year the Dorchester intercepting sewer has been constructed to Central avenue, thus completing the extension of the Improved Sewerage System ordered by the City Government in 1889. The further extension of this sewer up the valley of the Neponset will be built by the State under the direction of the Metropolitan Sewerage Commission. The work during the year has been carried on entirely by day labor under the superintendence of H. J. White.

Section 9 was completed early in the year.

Section 11 was finished in September. This section extends from Washington street through Baker's court and through private land bordering on the Neponset river, to Central avenue, a distance of 1,393 feet. At the beginning of the section the size of the sewer is reduced from 3 feet × 4 feet, egg-shaped, to 2 feet 4 inches × 3 feet 6 inches, egg-shaped. At Washington street the grade of the invert is about 8 feet above Boston city base. A rise of 3.8 feet in 40 feet is here made in the grade, after which the inclination is 1 in 313 for 900 feet, then 1 in 250 to Central avenue where the invert is about 17 feet above Boston city base.

The excavation in this section was largely in rock, and the construction presented some difficulty owing to the proximity of Baker's Mill pond, the centre line of the sewer

being within a few feet of the pond, while its invert was from four to six feet below the water level of the pond. A careful use of explosives prevented any considerable loss of water. As a precaution against future leakage from the pond two substantial bulkheads of brick were built encircling the sewer, cutting off the underdrains and extending entirely across the trench up to the surface of the ground. A flushing manhole, with a suitable gate, was built at the foot of Baker's court, and an inlet manhole was constructed nine hundred feet above it: the latter is connected with Baker's Mill pond by a 12-inch pipe fitted with a Chapman valve; the facilities for flushing are excellent. The contract for furnishing bricks for this section was awarded to Parry Bros. & Co., the lowest bidders, for $9.90 per M.; it was satisfactorily completed.

By the construction of the Dorchester intercepting sewer an outlet to Moon island is provided for that portion of the sewage of Dorchester which would otherwise pollute the Neponset river below Central avenue; the drainage of a large part of the town of Milton can be cared for in this way if desired.

NEPONSET INTERCEPTING SEWER.

On September 25, 1895, the following order of the Board of Aldermen was approved:

"Whereas, It is here adjudged to be necessary for the public convenience and the public health of the city of Boston to continue and extend the improved sewerage system of the city of Boston, as shown on the plan hereinafter mentioned, it is therefore

"*Ordered*, That intercepting sewers, in continuance and extension of the Improved Sewerage System of the city of Boston, be laid and constructed in the streets and places substantially as shown and indicated by dotted red lines on a plan dated January, 1895, and marked "City of Boston, Engineering Department, Plan of a Part of Dorchester, showing Route of Proposed Neponset Intercepting Sewer, William Jackson, City Engineer," and that the City Engineer be and hereby is directed to lay and construct the same, and that the expenses thereof be charged to the appropriation for Improved Sewerage."

In December last the work authorized by the above order was begun and 420 feet of 18-inch pipe, reinforced by concrete, have been laid in Chickatawbut street and Neponset avenue; the average cutting for this distance was 22 feet. The proposed Neponset system consists entirely of pipe

sewers. The flow in the common sewers now discharging into the Neponset river at Neponset avenue and Ericsson street will be intercepted and carried back to the Dorchester intercepting sewer, with which connection is made in Chickatawbut street at Narragansett. The grades established are necessarily flat, but an ample supply of salt water is available for flushing. The present sewer outlets will be utilized as storm overflows, and suitable tide-gates will be provided.

The necessity for additional overflows from the Dorchester intercepting sewer, to operate in periods of heavy rain when the sewage is very much diluted, is apparent, and their necessity will be further emphasized when the Neponset system is constructed and the main sewer is extended up the valleys of the Neponset and Mother brook to West Roxbury.

During the month of September work on improved sewerage construction was suspended and the force of men assisted in laying the 42-inch high-service main for the Water Department. In October and November they were employed at Highland park.

D.

[FROM THE CITY ENGINEER'S REPORT TO THE BOARD OF PARK COMMISSIONERS.

COMMONWEALTH AVENUE.

The construction of the driveways from Arlington street to Beacon street was completed so late in the season of 1894 that it was necessary to do considerable work in the spring to put them in proper condition.

A drain was built from near the Ericsson statue to the covered channel of Stony brook to take the surface water from that portion of the avenue between Massachusetts avenue and Charlesgate East, and the old catch-basins which were formerly drained by the leaching of the water through the ground were connected with this drain.

A cross-walk has been laid across the avenue at Kenmore street.

The plantations, where they abut on the cross-streets, have been graded so as to turn the water from them and the central path into the gutters, in order to prevent its flowing across the sidewalks.

In the summer the trees were badly infested with the *Orgyia leucostigma*, or tussock moth, and a number of boys were employed for the purpose of destroying the cocoons and eggs of the first brood of the moths. The caterpillar hatched from the eggs laid the previous fall completes its work of destruction in June, and then spins its cocoon in crevices of the bark of trees or other sheltered spots; the moth emerges about the twenty-first of June, and lays its egg upon the surface of the cocoon; the eggs hatch in a few weeks, and a second brood of caterpillars attacks the foliage of the trees; these, in turn, go through the various stages of development and deposit their eggs in the same manner as before; these eggs do not hatch until the following spring. The eggs can be readily found and easily destroyed when the trees are free from foliage. The work which was done in July and August was much more difficult than it would have been if done in the winter, but it was very satisfactory, and very little damage was done by the second brood of caterpillars, and very few of the eggs can now be found. The trees will be thoroughly examined during the coming month, and all eggs found destroyed, so that there

will probably be little damage done by this insect during the next summer.

The Fens.

The bridge over the Boston and Albany railroad on Charlesgate West having settled so as to interfere with traffic on the railroad, it was closed to travel in May; the bridge superstructure was raised 17 to 20 inches, and the abutments and adjoining retaining walls were built up to the new grade, the sidewalks and driveway on the approaches were brought up to grade and resurfaced, and the curbstones reset.

A portion of the drive and walks adjoining Fen bridge, which had settled so that they were not properly drained, were raised and resurfaced.

Stone seats and a curbing have been built around the foundation of the John Boyle O'Reilly statue on the triangular area at the junction of Boylston entrance with the Fenway. The foundation for the monument was built 1894.

Riverway.

Drives, Rides, and Walks. — The only work under this head during the year has been the surfacing of that portion of Audubon road between Brookline avenue and the Boston and Albany railroad. This has been completed, with the exception of the boundary walk and a part of the walk near the administration building. Granite steps have been built, leading from the walk to the entrance to the building.

Wall. — Ninety-five lineal feet of retaining wall have been built between Longwood avenue and Park street on the line of the parkway, connecting two sections of wall previously built.

Leverett Park.

Walks. — All of the walks except those on the hill north of Ward's pond have been finished.

Walls and Fences. — The walls on Perkins street were pointed in the spring, and an iron fence 261 feet in length was built on top of the wall on the easterly side of Chestnut street.

Miscellaneous. — A temporary boat-landing was built on Leverett pond. Repairs have been made to the pumping-station building and machinery, and a new drain built from the pump-well. A sewer has been built by the Street Department from Pond avenue through the park drive to Castleton street, and a branch is now being built from Castleton street to Perkins street.

The grounds prepared for planting in 1894 have been planted or seeded, but much remains to be done.

JAMAICA PARK.

Boating Service. — Three temporary boat-landings have been built; the permanent landing near Pond street was floored over with plank and a canvas-covered shelter built upon it. A wire was laid underground from Centre street to the boat-landing, for the purpose of supplying electric current to the electric launches, two of which were put into service in July. A large number of row-boats and canoes were also put into service at the same time.

Refectory. — The Perkins mansion, while in process of reconstruction for use as a refectory, was burned on March 5th. Nearly the whole of the interior and the roof were destroyed, but the walls were not materially injured. New plans were at once prepared by the architects, Messrs. Wheelwright and Haven, and the work is now nearing completion. A sewer is being built to connect the building with the sewer in Jamaicaway at Perkins street.

Miscellaneous. — A short flight of steps has been built on the walk leading from the northerly end of the pond to Jamaicaway.

Repairs have been made to the gate-house and to the conduit across Perkins street.

ARBORWAY.

No work has been done except at the crossing of the New York, New Haven and Hartford railroad, where the railroad company have begun the erection of the bridge which is to carry the railroad over the parkway and Morton street.

About 350 feet of water-pipe on the line of pipe leading from Jamaica pond to Franklin Park has been laid at the above crossing.

ARNOLD ARBORETUM.

The boundary wall on Centre and Walter streets has been finished, and the walls and posts for a gateway at the Forest Hills entrance have been built.

Plans are being prepared for a stone-crushing plant to be located on the reservation in the extension of the Arboretum, south of Bussey street.

WEST ROXBURY PARKWAY.

Considerable work was done on the topographical survey in the early part of the year, but it was discontinued on account of the press of other work. Work on the survey has, however, been recently resumed.

The exterior lines of the Parkway have all been marked on the ground by stone bounds.

Franklin Park.

Forest Hills Entrance. — The bridge, which was nearly finished a year ago, and described in the last report, has been entirely completed. The drains have all been built, and a portion of the drive surfaced. The ledge at the junction with Circuit drive has been removed.

Seaver Street. — The walks and slopes on the park side of the street have been finished, and trees have been planted on the northerly side of the street. The road from opposite Elm Hill avenue to the westerly end of the Greeting has been completed.

Refectory. — This building, begun in 1894, is not yet finished, but it is expected that it will be early in the spring. The wall supporting the terrace in front of the building was finished early in the year. The drive leading to the refectory from the Greeting is nearly sub-graded, and a wall is being built on the westerly side of it.

Water Supply. — Water-pipes have been laid from Forest Hills street to the reservoir on Hagborne hill. There yet remain about 4,000 feet of pipe to be laid on Arborway to complete the line from Jamaica pond to the reservoir.

The reservoir is completed and ready for use. It is entirely below the original surface of the ground, and was excavated chiefly in rock, the bottom resting entirely on rock. This would have made the cost of the reservoir excessively high, except for the fact that the excavation served as a quarry, from which material for road surfacing was obtained. Inasmuch as the level of the water in the reservoir could not well be kept at a constant height, and its appearance, if exposed, would be unsightly, it was thought best to have it covered.

The side walls are perpendicular, of American cement concrete, with a thickness nowhere less than one foot, the remaining space between the concrete and the ledge being filled with dry rubble.

Brick piers, 16 inches square and ten feet high, and 10 feet apart, were built for supporting the roof. On these piers arched ribs of brick masonry were built, running lengthwise of the reservoir, the rise of the arches being 1 foot, the span 9 feet 8 inches, the width 16 inches, and the thickness at the crown 8 inches; the spandrells were levelled up to the top of the arches. The ribs, together with the side walls, serve as supports for the cylindrical arches, of which there are seven, running lengthwise of the reservoir; these latter arches are of Portland cement concrete, with a rise of one foot in a span of 8 feet 8 inches, and are 8

inches in thickness. Manholes were built in each longitudinal arch.

The bottom of the reservoir is covered with a layer of American cement concrete 6 inches thick. The bottom and the side walls were covered with a layer of Portland cement mortar ½ inch thick, and then the whole surface of the side walls, bottom, and piers were covered with two coats of pure cement wash.

The top of the reservoir is covered with loam with a least depth of 2½ feet.

The 10-inch force main, which also serves as a supply main, branches in a manhole just outside the reservoir and near one corner; each branch is provided with a gate and check valve. The branch which supplies the reservoir enters about 6 inches above the bottom, and is carried diagonally across the reservoir nearly to the farther corner, where it ends in a globe-shaped casting with an opening on top; the pipe is supported on brick piers. The branch which serves for an outflow pipe passes under the bottom of the reservoir a short distance, and terminates with an opening at the level of the bottom; it is embedded in concrete.

At the northeasterly corner there is an outlet for draining the reservoir and an overflow pipe; this outlet is connected with the drainage system of the park, so that by its use water can be supplied to the ponds in the park.

The reservoir covers an area of 9,723 square feet, and has a capacity of 851,000 gallons, which is estimated to be a week's supply, in the driest time, for water-carts on the drive between the reservoir and Jamaica Park, and also for supplying the loss by evaporation from the ponds in Franklin Park.

Overlook Building. — Changes were made early in the year in the basement of this building in order to enlarge the women's lavatory about one-half.

Ellicottdale and Cottage. — The cottage was opened in June, with a matron in charge, and was kept open until November 14. There were a great many visitors, and the dressing and bath rooms were largely used by tennis players.

Tennis courts were laid out on the field, the department furnishing the poles and keeping the courts marked. The players provided their own nets, balls, and rackets, which they could check and leave in the cottage when not in use. The use of this ground is destined to be very popular. Its existence is not generally known, but it was no unusual sight during the past summer to see twenty courts occupied at one time.

Miscellaneous. — A temporary boat-landing was built at

Scarboro pond, and a boating-service was maintained here through the season.

A donkey service was established for Sundays, and was very much enjoyed by the children.

The number of sheep is now 221, there having been 82 sold in the fall.

Franklin Field.

A wooden fence 767 feet in length has been built on the line between the park property and the cemetery on the easterly side.

The only other work done during the year has been the caring for the grass. The turf has improved in condition generally, although there has been some settlement, due to the withdrawal of the water from the soil by the underdrains. Cracks also appeared in the turf; these and the low places have been filled.

During the latter part of the season the new ground was used for baseball and football games.

In October the first military parade occurred on this ground. Battery A of the Massachusetts Volunteer Militia occupied a portion of the field on the occasion of its fall field-day.

The water was turned on to the field on December 9, and the first skating was on December 14.

Dorchester Park.

No work has been done here during the year.

Dorchesterway.

No work of construction has been done here during the year by the Park Department. The Street Department has built a sewer on the southerly side of the parkway, between Pond street and Dorchester avenue.

An arrangement was made with the Street Department by which that department kept the completed drive sprinkled during the season, the expense being charged to the Park Department.

Strandway.

Considerable work has been done in making surveys and plans for the construction of that portion of this parkway east of O street, but owing to the delay in determining the method of construction at the sites to be occupied by the yacht clubs, nothing further has been done.

MARINE PARK.

Filling. — The work to be done under the contract with William L. Miller, dated July 27, 1894, was finished November 21. The total amount of filling done under this contract was 217,581 cubic yards, at 47 cents per cubic yard.

Iron Pier. — The settlement of the filling has broken some of the columns at the shore end of the pier, so that it will be necessary to put new foundations under them. As but slight injury has been done to the superstructure, and the movement of the columns has nearly ceased, it will be well to delay the repairs until the movement has entirely stopped.

Frequent measurements are being taken, and the structure is being carefully watched to see if any further damage occurs.

Head House. — The building itself has been completed and turned over to the Department. Several minor contracts for laundry machinery, electrical machinery, and lighting fixtures are yet unfinished.

Miscellaneous. — After the new building is occupied, there will be no further use for the old refectory building, and it should be removed and the grounds in its vicinity graded and planted.

In June a floating theatre was allowed to be located alongside the Castle island bridge. It was maintained by a private company, and, having proved a financial failure, was removed on July 18.

Range lights have been erected on the wooden pier by the United States Lighthouse Department, and an underground wire laid to them.

A channel has been dredged from the west wharf at Castle island to deep water, for the benefit of the boating-service.

The watering of the driveway was done throughout the season by the Street Department, at the expense of the Park Department.

PUBLIC PARK, NORTH END.

Surveys and plans have been made for the construction of a portion of this park. A contract was made on November 4 with Trumbull and Ryan for grading and building walls and drains on that portion of the park north of Commercial street for the sum of $41,752. This work is now in progress.

WOOD ISLAND PARK.

The iron fence around the gymnasium ground, and the iron frames for supporting the gymnastic apparatus, were

completed late in the summer. The cost of this work was $2,923.25.

The gymnastic apparatus was furnished and erected by the Narragansett Machine Company, of Providence, R.I., at a cost of $1,401.78. It consists of the following pieces:

10 Sets of chest weights.
10 Sets of breast bars.
4 Vault bars.
4 Horizontal bars, fixed uprights.
4 Sets flying rings.
18 Travelling rings.
2 Single trapezes.
1 Triple trapeze.
2 Stand swings.
1 Wide ladder.
1 Inclined ladder.
2 Cross ladders.
6 Tilting ladders.
2 Single upright poles.
2 Pairs upright poles, fixed 18 and 16 inches apart.
8 Climbing poles, swinging.
8 Climbing ropes.
3 Sets long inclined bars.
2 Sets high parallel bars.
1 Circular parallel.
2 Giant strides.
24 Iron quoits.
3 16-lb. iron shots.
2 56-lb. weights.
2 Sets jumping standards.
4 Vault poles.
2 Double wire slides.

Considerable grading was required in the gymnasium ground, and a cinder track 20 feet wide and one-fourth of a mile long was built around the grounds. A shed for chest weights, with lockers for small articles, and fences around the places for shot throwing and the cable slides have also been built.

The gymnasium was opened on September 6. The attendance until the close of the season was 43,356. The apparatus was dismantled on January 4, and preparations made for skating, of which an account will be found under the general head of Skating.

An area of the playground was covered with loam and sodded for use as a cricket ground.

The gymnasium ground is very wet after a heavy rain, and should be underdrained during the coming spring.

Charlestown Heights.

The building has been provided with fixtures for lighting. It was opened on June 17, and closed for the winter on November 14. A matron was in charge.

During August, a class in kindergarten work was conducted under the direction of the Massachusetts Emergency and Hygiene Association.

CHARLESTOWN PLAYGROUND.

No work has been done here during the year except to care for the filling done by the city teams and others.

The area now filled approximately to grade is 7.3 acres.

CHARLESBANK.

Men's Gymnasium. — The new building was occupied on September 30. It is 2½ stories. On the ground floor there is a large toilet-room for the public, a room for the use of the person in charge of the boating-service, a foreman's room, a workmen's room, and a room for the heater. On the second floor is an office for the superintendent of the gymnasium, a large locker and dressing-room, containing 196 lockers, a toilet-room, and a bath-room provided with 6 shower-baths and other fixtures.

The attic room is used as a store and work room. The building is lighted by electricity and is heated by hot water; both hot and cold water are supplied to the toilet and bath rooms. The entrance to the gymnasium is through this building, and by a bridge from the second floor across the running-track. Turn-stiles with a registering attachment are placed at the entrance so that a record of the attendance can be kept.

The gymnasium grounds were used for skating during February, but were closed during March and April. They were opened May 1, and kept open until January 3, when the apparatus was dismantled and the grounds flooded for skating. During the season the gymnasium was open on 197 days, the total estimated attendance being about 200,000.

During the year there were four accidents: three of these were while the gymnasium was in use, and were slight; the fourth was during the skating season, a little girl having been quite severely injured while attempting to climb over the fence.

Women's Gymnasium. — The enlargement of the building was completed early in the season, and it was opened on May 15.

The building has been doubled in size, and now contains on the first floor a general waiting-room, an office for the superintendent, a large dressing and locker room, containing 124 lockers, toilet and bath-rooms, heater-room, foreman's and workmen's rooms, and a store-shed. On the second floor there is a toilet-room for women, and a hall which is used for gymnastic exercises on stormy days. A full account of the work of the gymnasium during the year

will be found in the report of the Massachusetts Emergency and Hygiene Association, which has charge of the work.

Miscellaneous. — A drain was built in the spring, connecting the women's building with the sewer in Charles street, the drainage having been previously discharged into the river.

The grounds and walks are in good condition.

The sea-wall needs pointing badly, and it should be done early in the next season.

Skating.

As during the past year the first attempt has been made on a large scale to maintain ice in a condition for skating, an account of the work done and the results obtained may, perhaps, be of interest.

Heretofore, the appropriation for maintenance has been so small that very little could be done, and that only on the smaller grounds of Charlesbank and Wood Island Park.

Preparations were made to keep the ice in good condition on the larger areas of Jamaica Pond and Franklin Field. During the skating season, a year ago, visits were made to Roger Williams Park, in Providence, R.I., Central Park, New York, and Prospect Park, Brooklyn, N.Y., and through the kindness of the superintendents of those parks much valuable information was obtained. We are also indebted to the Superintendent of South Park, Chicago, and the Superintendent of Parks of Minneapolis for their assistance.

The work which we have done during the year was largely experimental, and therefore more expensive than is likely to be the case in the future to secure the same results.

The only natural water surface or pond where the ice has been cared for is Jamaica pond, which has an area of 65 acres. This pond does not freeze over until quite late, so that the skating season is shorter here than at other grounds. If the ice forms to a considerable thickness before it becomes covered with snow, the work is much simpler than it is when, as was the case this year, there is a heavy snowfall while the ice is too thin to support horses; the snow prevents the ice from forming, and the only resource is to make holes at frequent intervals; the weight of the snow forces the water up through the ice; the snow soon becomes saturated, and when frozen it is usually strong enough to support horses, but it is too rough for skating, chiefly on account of the tracks made by the men when making the holes. It is therefore necessary to plane the ice. For this purpose a special ice-plane was purchased. It consists of a square frame or sled, the runners of which are adjustable in height with reference to

the knife; the latter is fixed to the frame at right angles to the line of travel; at the back there is a pair of handles by which a man can guide the plane, and there is also a seat for the driver. The plane cuts a width of 52 inches, and can be easily hauled by two horses; with it from 2½ to 3 acres can be planed in a working day. It leaves the ice with a very smooth surface.

For removing the chips left by the planer, a scraper has been used, of the same pattern as is used in Central Park, New York. It consists of two vertical sides of boards, 8 feet in length and 18 inches high, joined together at one end at an angle of 60 degrees, the point being boarded over to form a seat for the driver. The open end has a strong brace, placed about midway of the height, and securely bolted to the sides, to the ends of which the draught rope is attached. The inside faces of the sides have strips of thin iron or steel fastened to them at the bottom; a handle is attached at the point for lifting it. This scraper is used with one horse, and is dragged over the ice with the open side in front. When a load is obtained, it is dragged to the bank, where the driver lifts the back corner, thus clearing the snow, turns the scraper on the front corners, and starts for another load. This scraper clears the ice in a very satisfactory manner. It can be used for clearing of light snow, a depth of 8 inches having been cleared successfully. The scoop scraper used by ice companies is very useful for piling the snow on to the banks, and thus preventing the settlement of the ice along the shore.

Where the number of skaters is large, the ice becomes worn in a short time, so that it is necessary to clean it. For this purpose, we have used one-horse street-sweeping machines loaned to us by the Street Department. The rims of the wheels were wound with wire to prevent slipping. The machines swept the material on the ice into windrows, and then the triangular scrapers hauled it to the shore. This operation could be repeated for several days in succession; after a time, however, the ice would become worn so unevenly that it would be necessary to plane it again. If a crust forms on the surface of the snow, the triangular scraper cannot be used until the crust is broken; to do this, the scoop-scraper can be run through the snow to break it up. About 7 acres can be swept by one machine in a working day.

About 20 acres have been kept in good condition during the past month by the above means.

At Franklin Field there is an area of over 40 acres of level meadow, which is kept dry in summer, but which can be flooded in winter by closing a gate at the outlet of the under-

drains, and turning the flow of the brooks on to the field. Ice can be formed here much earlier than on a pond. As soon as the ground freezes, the water is turned on to it; the water freezes to the ground, and the latter can then be flooded. This cannot be done on a pond, as the ice, being of less specific gravity than the water, always floats at the top. The same method of caring for the ice is pursued here as at Jamaica pond, but it can be done more economically, as there are no steep banks, and the snow can be scraped clear of the ice on to the surrounding ground; as there is no danger of the ice settling, piles of snow can be made at any point on the field. When the ice becomes rough it can be planed, or, if the weather will permit of it, it can be flooded and a new surface formed.

At Charlesbank and Wood Island Park, the conditions are similar to those at Franklin Field, except that there is no natural water supply, and resort must be had to hydrants. This can be done here, as the areas are small and the cost of the water is, therefore, not great. The most successful method of restoring the worn-out surface at these parks has been by spraying with the hose when the temperature is below freezing. By this means a good body of hard ice can be built up.

The attendance has been very large at all of the skating grounds. At Jamaica Park and Franklin Field there is great need of buildings for the accommodation of the large number of people who frequent these parks.

The following table gives some statistics showing the great interest felt by the people in the skating and the slight cost per person at which the amusement has been furnished:

	Jamaica Pond.	Franklin Field.	Charlesbank.	Wood Island Park.
No. of days' skating,	19	31	43	43
Total estimated attendance . . .	90,000	123,000	99,000	114,000
Area cleared and kept in condition for skating . .	20 acres	20 acres	1 acre	6 acres
Total cost . . .	$1,588 92	$864 18	$610 00	$675 24
Cost per acre . .	79 45	43 22	610 00	112 54
Cost per person .	01$\frac{3}{4}$	00$\frac{7}{10}$	00$\frac{6}{10}$	00$\frac{6}{10}$

The appended table shows the principal items of completed work to date.

Principal items of work completed on the several Parks to January 31, 1896.

	Main Park System.							Marine Park System.								
	Fens.	Riverway.	Leverett Park.	Jamaica Park.	Arborway.	Arnold Arboretum	Franklin Park.	Dorchester-way.	Marine Park.	Castle Island.	Charlesbank.	Wood Island Park.	Charlestown Heights.	Franklin Field.	Public Park, North End.	Totals.
Driveways completed	87,600 sq. yds. 4 miles.	26,461 sq. yds. 1.3 miles.	23,760 sq. yds. 1.2 miles.	13,244 sq. yds. 0.7 mile.	25,070 sq. yds. 1.3 miles.	30,388 sq. yds. 2.1 miles.	115,361 sq. yds. 7.7 miles.	4,620 sq yds. 0.2 mile.	17,685 sq. yds. 0.5 mile.							344,189 sq. yds. 19.0 miles.
Walks completed	30,600 sq. yds. 3.4 miles.	12,900 sq. yds. 1.5 miles.	17,627 sq. yds. 2.4 miles	9,734 sq. yds. 1 mile.	1,166 sq. yds. 0.1 mile.	16,138 sq. yds. 4.2 miles.	71,271 sq. yds. 10.3 miles.	1,883 sq. yds. 0.3 mile.	2,694 sq. yds. 0.3 mile.		14,432 sq. yds. 1.5 miles.		4,041 sq. yds. 0.4 mile.			182,486 sq. yds. 25.4 miles.
Ride completed	14,000 sq. yds. 1.1 miles.	17,500 sq. yds. 1.2 miles.	12,000 sq. yds. 0.9 mile	9,561 sq. yds. 0.7 mile.	17,920 sq. yds. 1.2 miles.		10,500 sq. yds. 0.75 mile.									81,781 sq. yds. 5.85 miles.
Gutters paved	19,900 sq. yds.	6,397 sq. yds.	5,335 sq. yds.	3,485 sq. yds.	7,194 sq. yds.	8,069 sq. yds	23,987 sq. yds.	785 sq. yds.	2,321 sq. yds.							77,473 sq. yds.
Curbstones set	32,931 lin. ft.	1,281 lin. ft.	2,028 lin. ft.	2,265 lin. ft.			9,630 lin. ft.	898 lin. ft.	1,297 lin. ft.				123 lin. ft.			50,453 lin. ft.
Water-pipe, 12 in.	10,026 lin. ft.	812 lin. ft.					200 lin. ft.					1,332 lin. ft.				12,370 lin. ft.
" 10 in.				523 lin. ft.	1,736 lin. ft.		3,380 lin. ft.		844 lin. ft.							6,483 lin. ft.
" 8 in.	252 lin. ft.		1,020 lin. ft.	3,197 lin. ft.	1,550 lin. ft.				17 lin. ft.			1,179 lin. ft.				7,215 lin. ft.
" 6 in.	137 lin. ft.		1,000 lin. ft.				4,135 lin. ft.		27 lin. ft.		234 lin. ft.	118 lin. ft.				6,651 lin. ft.
" 4 in.							1,578 lin. ft.					373 lin. ft.				1,951 lin. ft.
Reservoir							1									1
Hydrants	44		2			3	12		2		2	7				72
Drinking-fountains							9		1	2	5	1	1			19
Watering-trough for horses							1									1
Brick drains, 4 ft. 6 in.					1,316 lin. ft.											1,316 lin. ft.
" 2 ft. 9 in.							706 lin. ft.									706 lin. ft.
" 2 ft. × 2 ft. 6 in.							180 lin. ft.									180 lin. ft.
" 2 ft. 0 in.							859 lin. ft.							1,300 lin. ft.		2,159 lin. ft.
Pipe drains, 18 in.			312 lin. ft.		243 lin. ft.	315 lin. ft	3,540 lin. ft.					561 lin. ft.				4,971 lin. ft.
" 15 in.	778 lin. ft.			752 lin. ft.		298 lin. ft.	2,895 lin. ft.					196 lin. ft.		977 lin. ft.		5,896 lin. ft.
" 12 in.	462 lin. ft.			350 lin. ft.	123 lin. ft.	612 lin. ft.	2,023 lin. ft.					139 lin. ft.		976 lin. ft.		4,675 lin. ft.
" 10 in.	829 lin. ft.		294 lin. ft.	474 lin. ft	1,863 lin. ft.	367 lin. ft.	2,785 lin. ft.					406 lin. ft.	223 lin. ft.	1,501 lin. ft.		8,742 lin. ft.
" 8 in.	6,832 lin. ft.	3,964 lin. ft.	4,351 lin. ft.	418 lin. ft.	1,423 lin ft.	2,641 lin. ft.	9,812 lin. ft.	765 lin. ft.	1,373 lin. ft.		1,739 lin. ft.	2,581 lin. ft.	610 lin. ft.	245 lin. ft.	518 lin. ft.	37,272 lin. ft.
" 6 in.	263 lin. ft.	332 lin. ft.	186 lin. ft.		1,520 lin. ft.		2,515 lin. ft.						182 lin. ft.			4,798 lin. ft.
" 4 in.							190 lin. ft.									190 lin. ft.
Agricultural tile drains, 4 in.			240 lin. ft.				2,570 lin. ft.							185 lin. ft.		2,995 lin. ft.
" " 3 in.						3,045 lin. ft.	3,520 lin. ft.						328 lin. ft.			6,913 lin. ft.
" " 2 in.						2,353 lin. ft.	26,783 lin. ft.					3,109 lin. ft.		6,969 lin. ft.		39,214 lin. ft.
" " 1½ in.					3,425 lin. ft.	3,410 lin. ft.	27,470 lin. ft.					1,547 lin. ft.		44,028 lin. ft.		79,880 lin. ft.
Total drains	9,154 lin. ft.	4,296 lin. ft.	5,383 lin. ft.	1,994 lin. ft.	9,713 lin. ft.	13,061 lin. ft.	86,848 lin. ft.	785 lin. ft.	1,373 lin. ft.		1,739 lin. ft.	8,539 lin. ft.	1,343 lin. ft.	56,181 lin. ft.	518 lin. ft.	199,907 lin. ft.
Flush-tank							1									1
Manholes	10	2	3	6	9	2	74	1			17	10	3	7		144
Catch-basins and inlets	107	61	42	18	41	63	186	6	11		19	13	11	10	4	592
Open channel for brook							2,300 lin. ft.							3,530 lin. ft.		5,830 lin. ft.
Electric-light cable	18,893 lin. ft.	7,433 lin. ft.	14,500 lin. ft.	4,330 lin. ft	8,152 lin. ft.		13,865 lin ft.		2,683 lin. ft.							69,856 lin. ft.
Electric lights	51	20	53	12	22		35		10	33	13		4			253
Gateways							4									4
Bridges and culverts *	8	6	12		2	4	4		1 iron pier.	1		1				39
Boundary wall						2,113 lin. ft.	4,637 lin. ft.				2,228 lin. ft.		512 lin. ft.			9,490 lin. ft.
Buildings	1	3	1				6		1		2	2	1			16
Flag-staffs							1		1		1					3
Area of ground finished	107 acres.	35 acres.	43 acres.	13.2 acres.	10.6 acres.	155 acres.	344 acres.	1.5 acres.	15.4 acres.		10 acres.	5.5 acres.	3.4 acres.	42 acres.		785.6 acres.
Flumes														2		2
Retaining-wall	688 lin. ft.	543 lin. ft.	2,343 lin. ft.	1,525 lin. ft.			3,173 lin. ft.								32 lin. ft.	8,304 lin. ft.
Stone-wall				1,171 sq. yds.												1,171 sq. yds.
Gate-chambers	1	1		1								3				6
Cinder track											2,321 sq. yds. 0.2 mile.	3,081 sq. yds. 0.25 mile.				5,902 sq. yds. 0.45 mile.
Fence	8,750 lin. ft.		261 lin. ft.	694 lin. ft.							3,412 lin. ft.	1,345 lin. ft.		767 lin. ft.		15,229 lin. ft.

* Eight of these bridges are partly in Brookline.

drains, and turning the flow of the brooks on to the field. Ice can be formed here much earlier than on a pond. As

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[FROM THE CITY ENGINEER'S REPORT TO THE STREET DEPARTMENT.]

The following is a report of the work done under my direction for the Street Department during the year 1895:

The work done is similar to that heretofore, with the addition of a large amount of work upon the five main avenues, the construction of which was authorized by the Legislature of 1895, Chapters 268 and 334, referring back to Chapter 323 of the Acts of 1891; namely, Blue Hill avenue, Columbus-avenue extension, Huntington avenue, Commonwealth-avenue extension, and Brighton avenue. These acts require the construction of sewers, gas and water pipes in each avenue, with house connections for all abutting lots. The construction of these, together with other miscellaneous structures, such as water-main pipes, underground wires, and surface drains, intended to forestall the necessity for breaking up the surface of the finished street, require a large amount of labor to be performed before the surfacing of the street can be commenced.

In these avenues, a very large amount of this preliminary work has been done. Early in the year estimates were made of the cost of construction of these avenues, exclusive of sewers and land damages, upon a definite plan, and such rough grading as could be done in advance of sewer construction was commenced; then as fast as the sewer construction was completed contracts were made for grading. The work of grading has been in progress during the winter, and with a single exception all the rough grading contemplated at present is under contract and should be completed by June 1, 1896. The exception referred to consists of about 20,000 cubic yards of surplus material on Blue Hill avenue opposite Franklin park. A part of this material can be used to supply a deficiency on Columbus avenue, and it is probable that the remainder can be used for contemplated improvements in the near vicinity.

BLUE HILL AVENUE.

The portion of the avenue laid out under the act commences at Washington street or Grove Hall, and follows the

course of the old Blue Hill avenue to the Neponset river at Mattapan, a distance of 2.86 miles, nearly in a straight line. The part between Washington and Walk Hill streets, a distance of 2.21 miles, has been ordered to be constructed. The part under construction borders on Franklin Park for a distance of 2,670 feet, and Franklin Field a distance of 1,340 feet. It is 120 feet wide throughout, and will be built for the greater part of its length with two roadways, each 32.5 feet wide, a central reservation 25 feet wide for street-cars, and two sidewalks, each 15 feet wide. The sidewalk will have a loamed space 5 feet in width next the roadway, and the central reservation will be loamed and grassed.

In front of Franklin Park this construction will be varied and provision made for easy access to the park. The roadways are to be built of Telford macadam, with paved gutters, but with edgestone from Washington street to the circle at Talbot avenue only. Ten contracts for rough grading have been made, seven of which are not completed at this date. One of these contracts includes the road construction opposite the main entrance to Franklin Park, and calls for completion of this section by August 1, 1896.

Provision has been made for saving all stone suitable for use in constructing roadways, but a large part of the rock excavated is of such inferior quality as to be only suitable for filling. The estimated quantities of grading to be done under these contracts, and the corresponding cost of doing the work, is as follows:

Earth excavation . .	100,796.77 cubic yards.
Rock excavation . .	28,600 cubic yards.

The average prices to be paid are as follows:

Earth excavation . .	$0.356 per cubic yard.
Rock excavation . .	1.023 per cubic yard.

The total amount paid to contractors for work done to February 1, 1896, is $18,663.35.

Columbus Avenue Extension.

This avenue extends from Northampton street to Franklin Park, by the way of Roxbury Crossing, along Pynchon to Centre street, then through vacant land to and across Washington street and by way of Seaver street to Franklin Park, — a total distance of 2.21 miles. It is generally 80 feet wide, and is to be built without a special reservation for a street railway. The section between Roxbury Crossing and Hog

bridge is about 3,105 feet in length and includes the present and prospective site of Stony brook; the improvement of the brook will necessarily precede the construction of the road, and, with the exception of the removal of the buildings, filling cellars, etc., no work has been or can be done at present. It is intended to pave this section with granite blocks. From Roxbury Crossing to the old part of the avenue, the roadway will be of asphalt. From Centre street to the park the roadway will be of Telford macadam. The only work done by this department has been the rough grading between Washington and Centre streets. A considerable part of the avenue will be in readiness for road-making on the opening of the working season, and with the exception of the Pynchon-street section, the work will be practically finished during 1896.

HUNTINGTON AVENUE.

This avenue extends from Copley square, along the line of the old avenue to Tremont street, and thence follows the former location of Tremont street to the Brookline line, at the Parkway, a distance of 2.25 miles. From Copley square to Massachusetts avenue, a distance of 3,240 feet, the boundary lines are unchanged, but the avenue will be rebuilt with a reserved space of 25 feet wide for street cars, two roadways, paved with granite blocks, each 25 feet wide, and two sidewalks, paved with bricks, each 12½ feet wide. From Massachusetts avenue to Tremont street, a distance of 1.15 miles, the avenue is widened to 100 feet, laid out in the same manner and built with Telford macadam roadways and gravel sidewalks. The part of Tremont street renamed Huntington avenue, 2,563 feet in length, has been widened to a general width of 80 feet. In this section there will be no reservation for street cars. Roadways will be built of Telford macadam, and the sidewalks, which will be 13 feet wide, will be built of gravel. The preliminary underground work is well advanced on this avenue, and it is expected that the surfacing can be begun early in the season. The work done by this department was the resetting of the edgestones and the regulating of the sidewalks on the northerly side, between Copley square and Massachusetts avenue, and the depositing of about 10,000 cubic yards of filling between Gainsborough street and Longwood avenue. This will not complete the filling between these points, and the balance of about 15,000 cubic yards will be supplied from the surplus on the remaining parts of the avenue. The gravel filling referred to is being furnished for $0.79¾ per cubic yard, and the work will be completed in February, 1896.

Brighton Avenue.

This avenue extends from Commonwealth avenue to Union square, Allston, a length of 0.67 mile. It is 100 feet wide, and will be built with a central reservation 25 feet in width for a street railway, two roadways, the northerly one 30 feet wide and the southerly one 25 feet wide, and two sidewalks each 10 feet wide. The roadways are to be built of Telford macadam.

Preliminary underground work is well advanced and the surfacing is under contract, conditioned to be completed on September 1, 1896. Amount paid to contractors for grading, to February 1, 1896, is $2,467.63.

Commonwealth Avenue Extension.

Commonwealth avenue has been extended from Chestnut Hill avenue, Brighton, to the Newton line, there connecting with the Newton boulevard; the extension is 0.71 mile in length and 120 feet in width. It is to be built with a central reservation 25 feet in width for a street railway, two roadways, the northerly one 25 feet wide and the southerly one 40 feet wide, and the two sidewalks each 15 feet wide. The roadways are to be built of Telford macadam. Four contracts for rough grading have been let, one of which is still unfinished. A large quantity of excellent stone for road construction has been found, and there will be a considerable surplus of stone and of loam available for other avenues. Trap rock of excellent quality is now being delivered at the city stone-crusher near by, and is being crushed and piled for future use. Eleven thousand one hundred and fifty cubic yards of surplus filling has been delivered on the adjoining section of Commonwealth avenue. The rough grading, including rock excavation, will be completed early in the season, and it is expected that the underground work can be completed in time to allow of the entire completion of the avenue during 1896. The total amount of earth excavation is estimated at 35,732 cubic yards, and of rock excavation at 9,200 cubic yards. Earth excavated and delivered within three-quarters of a mile has cost an average of $0.284 per cubic yard; earth delivered on the adjoining section of Commonwealth avenue, hauled about one mile, has cost $0.228 extra per cubic yard for hauling. Rock excavation, including breaking, hauling, and piling, has cost an average of $1.30 per cubic yard measured in the cut. The total sum paid to the contractors for grading, to February 1, 1896, is $14,070.79.

The table showing lengths and areas of paving on accepted streets has been carefully revised and compared with the list of streets in Boston, published by the Street Commissioners. As has been before stated, there is and can be no complete and authoritative list of public streets in Boston. The older streets have become public in many instances without record, and frequently the status of streets and alleyways has been questioned in the interest of abutters. The manuscript list in this office, and from which the table has been made, is as nearly complete as it can be made at this date. In this connection it should be stated that 3,600 square yards of asphalt pavement, commenced (the concrete base only being laid) in 1894 and completed in 1895, have been credited to 1894 in the tables.

Block-stone pavement has been laid with concrete 6 inches thick with a cushion coat of sand about 1½ inches thick. The material used for filling joints, adopted by the Street Department, was pebbles and Portland cement grout. The cement grout has been mixed with sand in varying quantities for experimental purposes. The proportion of one part cement to one-fourth part of fine house sand was found to give the best results, and was adopted for most of the work done. The quantity of cement used varied greatly on different jobs, the average of all works done being 9.94 square yards of pavement per cask of cement, at a cost for cement of $0.231 per square yard. The cost of filling joints in this manner has been about $0.20 less than the sum paid in 1894 for pitch and pebble joints.

Street-paving, on old and new streets, has been supervised in all cases where requested, and the following quantities have been laid under contracts supervised by this department:

Block-stone pavement, on a concrete base, laid with Portland cement grout joints, 14,428 square yards, at an average cost of about $4.25 per square yard.

Block-stone pavement, on a gravel base, laid with Portland cement grout joints, 11,405.6 square yards, at an average cost of about $3.10 per square yard.

Block-stone pavement, on a gravel base, laid with gravel joints, 13,579 square yards, at an average cost of about $2.75 per square yard.

Trinidad sheet asphalt, with a binder course of asphaltic cement concrete, on an American cement concrete base, 10,639.3 square yards, at an average cost of about $3.65 per square yard.

Sicilian rock asphalt, on an American cement concrete

base, 7,293.7 square yards, at an average cost of about $3.65 per square yard.

Edgestones set, 36,093 linear feet; brick sidewalks laid, 20,621.5 square yards; gravel sidewalks constructed, 1,835 square yards; flagging cross-walks laid, 2,217 square yards.

The following is a statement of the streets paved and constructed, for which plans were made and grades given, and the work supervised:

Ash Street. — From Oak to Nassau street was paved by H. Gore & Co. with Sicilian rock asphalt, with a base course of bituminous concrete on the existing cobble-stone pavement. Before putting down the base course, the old cobble-stone pavement was relaid by H. Gore & Co.

Barton Street. — From Leverett to Milton street was paved with Sicilian rock asphalt on an American cement concrete base. The old pavement was removed and the subgrading was done by the Paving Division. The concrete base and asphalt surface was laid by the Boston Asphalt Company. The edgestones were reset and the brick sidewalks relaid by H. Gore & Co. The pavement removed was old cobble-stones and granite blocks.

Billerica Street. — From Causeway to Minot street was paved with large granite blocks, on a gravel base, with Portland cement grout joints. The old pavement was removed and subgrading done by the Paving Division. The roadway was paved, brick sidewalks relaid, and edgestones reset by A. A. Libby & Co. The pavement removed was old cobble-stones.

Bond Street. — From Hanson to Milford street was paved with Trinidad asphalt, with asphaltic cement concrete binder on an American cement concrete base. The street was subgraded by the Paving Division. The concrete base and asphalt surface was laid by the Barber Asphalt Paving Company. The edgestones were reset and brick sidewalks relaid by T. H. & W. A. Payson. The former surface was macadam.

Brimmer Street. — From Beacon to Pinckney street was paved with Trinidad asphalt, with asphaltic cement concrete binder on an American cement concrete base. The subgrading was done by the Paving Division. The concrete base and asphaltic surface were laid by the Barber Asphalt Paving Company. Edgestones were reset, brick sidewalks and flagging cross-walks were relaid by T. H. & W. A. Payson. The former surface was macadam.

Chambers Street. — From Brighton to Charles street was paved with Trinidad asphalt, with asphaltic cement concrete

binder. That portion from Brighton street through Auburn street has an American cement concrete base; that portion from Auburn to Charles street was laid on old cobble-stone pavement. The concrete base and asphalt surface were laid by the Barber Asphalt Paving Company. Sub-grading was done by the Paving Division. Edgestones were reset, brick sidewalks and flagging cross-walks relaid by T. H. & W. A. Payson. The former pavement was old cobble-stones.

Charles Street (easterly side). — From Pinckney to Cambridge street, including the easterly track of the West End Street Railway, and also the four-foot space between the tracks, was paved with large granite blocks, with Portland cement grout joints, on an American cement concrete base. The old pavement was removed and sub-grading done by the Paving Division. Concrete base and block paving was laid, edgestones reset, and brick sidewalks relaid by H. Gore & Co. The former pavement was old granite blocks. The West End Street Railway, by agreement, paid for the work done in their tracks. Work in front of the Eye and Ear Infirmary, which has been postponed on account of unfavorable weather the previous season, was completed. The crushed stone, which was used to make the street passable temporarily, was taken off and about four inches of the concrete base was removed and replaced with four inches of Portland cement concrete, on which 2½ inches of Sicilian rock asphalt was laid by H. Gore & Co.

Charter Street. — From Unity street to Jackson avenue was paved with large granite blocks, on a gravel base, with Portland cement grout joints. The old pavement was removed and the sub-grading done by the Paving Division. The roadway was paved, brick sidewalks relaid, and edgestones reset by C. L. Ward. The pavement removed was old cobble-stones.

Columbus Avenue. — From Park square to beyond Ferdinand street was paved with large granite blocks, on an American cement concrete base, with Portland cement grout joints. The old pavement was removed, the sub-grading done, the concrete base laid, the roadway paved, edgestones reset, and brick sidewalks relaid by H. Gore & Co. The West End Street Railway, by agreement, paid for the work done in their tracks. Two new catch-basins were built. The former pavement was old granite blocks.

Devonshire Street. — From Franklin to Milk street was paved with large granite blocks, on an American cement concrete base, with Portland cement grout joints. The old pavement was barred out and loaded, the sub-grading was done, concrete base laid, the roadway paved, and flagging

cross-walks laid by James Grant & Co. The Paving Division furnished teams for carting away surplus material. The former pavement was old granite blocks.

Edinboro' Street. — From Essex to Beach street was paved with Trinidad asphalt, with an American cement concrete base and asphaltic cement concrete binder, by the Barber Asphalt Paving Company. The sub-grading was done by the Paving Division. The edgestones were reset and brick sidewalks relaid by P. Brennan & Co. The former surface was macadam.

Fabin Street. — From Newland to Ivanhoe street was paved with Sicilian rock asphalt, with an American cement concrete base, by the Boston Asphalt Company. The sub-grading was done by the Paving Division. Edgestones were reset, brick sidewalks and cross-walks relaid, by H. Gore & Co. The former pavement was cobble-stones.

Harrison Avenue (westerly side). — From about 85 feet south of East Newton street to 100 feet south of East Springfield street, and (easterly side) from East Newton street, through Stoughton street, was paved with Trinidad asphalt, on an American cement concrete base, with asphaltic cement binder, by the Barber Asphalt Paving Company. The sub-grading was done by the Paving Division. The former pavement was granite blocks.

Henchman Street. — From Charter to Commercial street was paved with large granite blocks, on a gravel base, with Portland cement grout joints. The sub-grading was done by the Paving Division. The roadway was paved, edgestones reset, brick sidewalks and flagging cross-walks relaid, by J. B. O'Rourke & Co. The former surface was macadam.

Lancaster Street. — From Causeway to Merrimac street was paved with large granite blocks, on a gravel base, with Portland cement grout joints. The sub-grading was done by the Paving Division. The roadway paved, edgestones reset, brick sidewalks and flagging cross-walks relaid, by John Turner & Co. The former pavement was asphalt, so worn that the cobble-stones on which it was laid were exposed for large areas.

Massachusetts Avenue (southerly side). — From Washington to Albany street was paved with Sicilian rock asphalt, on an American cement concrete base, by H. Gore & Co. Work on the above, which had been postponed on account of unfavorable weather the previous season, was completed in June, 1895. A part of the asphalt surface, which was laid in 1894, was taken up and relaid, the surface of the concrete

base scraped off and repaired, in part with Portland cement concrete, and in part with an asphaltum concrete binder.

Merchants Row. — From State to North street was paved with large granite blocks, on an American cement concrete base, with Portland cement grout joints. The sub-grading was done by the Paving Division. The concrete base put down, paving laid, edgestones reset, brick sidewalks and flagging cross-walks relaid, by A. A. Libby & Co. The former pavement was granite blocks.

North Margin Street. — From Thacher to Stillman street was paved with Trinidad asphalt, on an American cement concrete base, with asphaltic cement concrete binder, by the Barber Asphalt Paving Company. The sub-grading was done by the Paving Division, edgestones were reset and brick sidewalks were repaved by T. H. & W. A. Payson. The former pavement was part cobble-stones, part old asphalt on cobbles, and part macadam.

Otis Street. — From Summer street to Winthrop square was paved with large granite blocks, on gravel base, with Portland cement grout joints. The old pavement was barred out and loaded, the sub-grading was done, the roadway paved, and the flagging cross-walks relaid by James Grant & Co. The Paving Division furnished teams for carting away the surplus materials. The former pavement was old granite blocks.

Oxford Street. — From Beach to Essex street was paved with Trinidad asphalt, on existing macadam, with asphaltic cement binder and base course, by the Barber Asphalt Paving Company.

Pinckney Street. — From Charles through Brimmer street was paved with Trinidad asphalt, on an American cement concrete base, with asphaltic cement concrete binder, by the Barber Asphalt Paving Company. The sub-grading was done by the Paving Division. The edgestones were reset and the brick sidewalks repaved by T. H. & W. A. Payson. The former surface of the street was macadam.

Prince Street. — From Hanover street to Bennett avenue was paved with Sicilian rock asphalt, on an American cement concrete base, by H. Gore & Co. The existing block pavement was removed and the sub-grading done by the Paving Division. Edgestones were reset, brick sidewalks and flagging cross-walks were relaid, by H. Gore & Co. The old paving-blocks were used on Barton street and on Noyes place. The former pavement was old granite blocks.

Spring Street. — From Poplar to Leverett street was paved with Trinidad asphalt, with asphaltic cement concrete base course and binder, on existing cobble-stone pavement, by the

Barber Asphalt Paving Company. The edgestones were reset and the brick sidewalks and flagging cross-walks relaid by J. Turner & Co. The former pavement was cobble-stones.

Summer Street (northerly side). — From Washington to Federal street, with the exception of a part at High street, was paved with large granite blocks, on an American cement concrete base, with Portland cement joints. The sub-grading was done by the Paving Division. The paving was laid, the edgestones reset, and the brick sidewalks and flagging cross-walks relaid by James Grant & Co. By agreement, the West End Street Railway Company paid for 1,438.7 square yards, at the rate of $0.38 per square yard; and the Edison Electric Illuminating Company paid for 936.3 square yards, at the rate of $0.38 per square yard. The former pavement was old granite blocks.

Tileston Street. — From Salem to Wiggin street was paved with Trinidad asphalt, on an American cement concrete base, with asphaltic cement concrete binder, by the Barber Asphalt Paving Company. The sub-grading was done, the edgestones were reset, and the brick sidewalks relaid by the Paving Division. The former pavement was old cobble-stones.

Warren Street (Charlestown). — From Winthrop to Soley street was paved with Sicilian rock asphalt, on an American cement concrete base, by the Boston Asphalt Company. The sub-grading was done by the Paving Division. The edgestones were reset, the brick sidewalks and flagging cross-walks relaid, by John Turner & Co. The pavement removed was old granite blocks.

West Street. — From Tremont to Washington street was paved with large granite blocks, on an American cement concrete base, and Portland cement grout joints. The old pavement was removed, the sub-grading done, the concrete base laid, the paving laid, the edgestones reset, the brick sidewalks and flagging cross-walks relaid, by H. Gore & Co. The former pavement was old granite blocks.

Whitmore Street. — From Kneeland to Harvard street was paved with Sicilian rock asphalt, on an American cement concrete base, by the Boston Asphalt Company. The sub-grading was done by the Paving Division. The edgestones were reset and the brick sidewalks and flagging cross-walks relaid by H. Gore & Co. The former pavement was macadam.

New Streets.

Construction on the following streets has been done under Chapter 323 of the Acts of the Legislature of Massachusetts

of 1891, and Acts in amendment thereof or in addition thereto. Five of them, namely, Boylston street, Ivy street, Norway, Parker, and St. Germain streets, were commenced in 1894.

Boylston Street. — From Boylston road to Brookline line is about 2,070 feet long. The work of filling to sub-grade was begun on this street in 1894 and completed April 27, 1895, at a total cost of $47,819.37, at the rate of $0.62½ per cubic yard. The contractor was John O'Brien. No contracts have yet been made for constructing the street, as extensive sewer construction upon piles is in progress.

Harvard Avenue. — From Commonwealth avenue to the Brookline town line is about 550 feet long. The contract for constructing this avenue was awarded to William Scollans. Work was commenced October 19, 1895, and completed December 21, 1895, at a total cost of $3,313.09. This is a Telford macadam road, with gravel sidewalks; the base is eight inches and the surface four inches in thickness. Telford stone and crushed stone was furnished and delivered by the city; the edgestones were furnished by the city and hauled by the contractor.

Ivy Street. — From St. Mary to Mountfort street, not including the Audubon road intersection, is about 772 feet long. Work was begun on this street in 1894 and completed June 15, 1895, at a total cost of $7,322.44. It is a 6-inch macadam road with brick sidewalks. The contractors were James Grant & Co. Crushed stone was furnished and delivered by the city; the edgestones were furnished by the city and hauled by the contractor.

Kenmore Street. — From Commonwealth avenue to Newbury street is about 239 feet long. The contract for constructing this street was awarded to Doherty & Connors. Work was begun July 22, 1895, and completed August 12, 1895, at a total cost of $974.23. It is a 6-inch macadam road with brick sidewalks. The crushed stone was furnished and delivered by the city; edgestones were furnished by the city and hauled by the contractors.

Norway Street. — From Massachusetts avenue to Falmouth street is about 610 feet long. The contract for constructing the street was awarded to Quimby & Ferguson. Work was begun May 21, 1895, and completed August 7, 1895, at a total cost of $3,162.27. This is a Telford macadam road, with brick sidewalks; the base is eight inches and the surface four inches in thickness. Telford stone and crushed stone were furnished and delivered by the city; the edgestones were furnished by the city and hauled by the contractors.

Parker Street. — From Huntington avenue to Westland

avenue is about 1,687 feet long. Work was begun on this street in 1894, as noted above, and completed June 19, 1895, at a total cost of $23,850.26. The contractors were Doherty & O'Leary. It is a Telford macadam road, with brick sidewalks; the base is ten inches and the surface six inches in thickness. The contractors furnished all materials used in constructing this street.

St. Germain Street. — From Massachusetts avenue to Dalton street is about 749 feet long. Work was begun on this street in 1894, and completed June 8, 1895, at a total cost of $4,923.36. The contractors were Quimby & Ferguson. It is a Telford macadam road, with brick sidewalks; the base is eight inches and the surface four inches in thickness.

Sherborn Street. — From Commonwealth avenue to Charles river is about 464 feet long. The contract for constructing this street was awarded to Doherty & Connors. Work was begun July 23, 1895, and completed October 5, 1895, at a total cost of $4,214.21. This is a 6-inch macadam road, with gravel sidewalks. In addition to the above work, a capstone and iron fence were placed upon the sea-wall at the river; the capstone was furnished and laid by Joseph Ross for $4.92 per lin. foot for 64 feet, or $315. The iron fence, built and erected by P. J. Dinn, for $118, is 63 feet 9 inches long. Crushed stone was furnished and delivered by the city; edgestones were furnished by the city and hauled by the contractor.

Grading Street-Railway Tracks.

The grades for tracks in the following streets have been determined and furnished to the street-railway companies. On streets marked * the surveys were made and levels taken by the railway companies.

West End Street Railway.

Battery Street. — From Commercial street to North Ferry.

Brighton Avenue. — From Commonwealth avenue to Cambridge street.

**Brookline Avenue.* — From Longwood avenue to the Fenway.

**Caldwell, Perkins, and Brighton Streets* (Charlestown). — From Main to Cambridge street.

**Chelsea Street* (Charlestown). — From Bunker Hill street to Vine street.

Columbus Avenue. — From Park square to beyond Ferdinand street.

**Commonwealth Avenue.* — From St. Paul street to beyond Essex street.

East Sixth Street. — From N street to O street.

Harvard Avenue. — From Commonwealth avenue to Brookline line.

Huntington Avenue. — From 200 feet north of Vancouver street to beyond Longwood avenue.

Longwood Avenue. — From Autumn street to Huntington avenue.

Lowell Street. — From Causeway street to Brighton street.

**Norfolk Street.* — From Washington street to the N.Y. & N.E. R.R. bridge.

P Street. — From Fourth street to Sixth street.

**Shawmut Avenue.* — From Dover street to Roxbury street.

Summer Street. — From Washington street to Kingston street.

**Summer Street.* — From Kingston street to Federal street.

* *Warren Street.* — From Dudley street to Grove Hall.

Washington Street. — From Parsons street to Oak square.

NORFOLK SUBURBAN STREET RAILWAY.

**River Street.* — From Blue Hill avenue to the Lower Mills.

LYNN & BOSTON STREET-RAILWAY COMPANY.

**Chelsea Street.* — From Vine street to Scotts court.

MISCELLANEOUS WORK.

Ashmont Street and Dorchester-avenue Bridge. — Plan and proposed grades for additions to the bridge over the N.Y., N.H., & H. R.R. (Old Colony System), necessitated by the construction of the Talbot-avenue extension.

Algonquin and Bradlee Streets. — Plan of proposed park curbing for planting-space.

Sherborn Street. — Plans of proposed granite capstone for sea-wall, and also for iron fence.

Catch-Basins. — Details of coping and gutter-stones for corners, Bradlee pattern.

Riverside Gravel Bank (Auburndale). — Plan and cross-section of bank for gravel used for filling on Boylston-street extension.

Harrison Avenue (from East Newton street to East Springfield street). — Plan showing limits of asphalt pavement under guarantee.

Commonwealth Avenue (at Washington street). — Plan and cross-section of ledge for measurement.

Chelsea Street (at Scotts court). — Plan and profile showing grades of edgestone for the B. & M. R.R. Company.

Surveys, plans, and estimates for improving and paving the following streets have been made:

Barton Street. — From Lowell street to Minot street.

Beacon Street. — From Arlington street to Dartmouth street.

Doane Street. — From Kilby street to Broad street.

Garland Street. — From Washington street to Shawmut avenue.

Harrison Avenue. — From Harvard street to Kneeland street.

Lowell Street. — From Causeway street to Brighton street.

Newbury Street. — From Arlington street to Dartmouth street.

Surveys and plans were made for work upon the following streets: grades and lines given, but the work of construction was not supervised by this department:

Austin Street (Charlestown). — From the Fitchburg Railroad track to the B. & M. R.R. track was paved with large granite blocks, on a gravel base, with gravel joints.

Barrett Street. — From Fulton street to North street was paved with large granite blocks, on a gravel base, with Portland cement grout joints; the old pavement was removed and the sub-grading done by the Paving Division. The roadway was paved, the edgestones reset, and the brick sidewalk relaid by A. A. Libby & Co. The former pavement was of cobble-stones.

Barton Street. — From Leverett street to Lowell street was paved with granite blocks taken from Prince street and from part of Barton street. The blocks were laid on a gravel base with gravel joints. The old pavement was taken up and sub-grading done by the Paving Division. The roadway was paved, the edgestones reset, and the brick sidewalks relaid by J. Turner & Co. The pavement removed was of old granite blocks.

Castle Street. — From Washington street to Tremont street was paved with granite blocks, on a gravel base, with Portland cement grout joints. The sub-grading was done by the Paving Division; the roadway was paved, the edge-

stones reset, brick sidewalks and cross-walks relaid, by James Grant & Co. The old pavement was taken up and relaid.

Commonwealth Avenue. — From Cottage Farm bridge to Warren street, lines and grades were given and measurements made for a large amount of work done upon this part of the avenue by the Street Department.

East Eighth Street. — From H street to K street was paved with large granite blocks on a gravel base, with gravel joints. The sub-grading was done by the Paving Division. The roadway was paved, edgestones reset, brick sidewalks and cross-walks relaid, by J. B. O'Rourke & Co. Two new catch-basins were built. The former surface was macadam.

East Sixth Street (northerly side). — From N street to O street was paved with large granite blocks, on a gravel base, with gravel joints. The sub-grading was done by the Paving Division. The roadway was paved, edgestones reset, and the brick sidewalks and flagging cross-walks relaid by J. B. O'Rourke & Co. The former surface was macadam.

Lewis Street. — From Commercial street to North street was paved with large granite blocks, on a gravel base, with Portland cement joints. The sub-grading was done by the Paving Division. The roadway was paved, the edgestones reset, and the brick sidewalks and flagging cross-walks relaid by A. A. Libby & Co. The former pavement was cobble-stones.

Maverick Street. — From Chelsea street to the B. & M. R.R. crossing was paved with large granite blocks, on a gravel base, with gravel joints. The sub-grading was done by the Paving Division. The roadway was paved, the edgestones reset, and the brick sidewalks relaid by C. L. Ward. The former pavement was part cobble-stone and part macadam.

P Street. — From Fourth street to Sixth street was paved with large granite blocks, on a gravel base, with Portland cement grout joints. The sub-grading was done by the Paving Division. The roadway was paved, the edgestones reset, and the brick sidewalks relaid by J. B. O'Rourke & Co. The former surface was macadam.

The work done by the Surveying Division of this department, for the Street Department, has been almost exclusively in the giving of street lines and grades, for setting and resetting curbstone, laying brick sidewalks, and the measurement of the work so constructed, together with the measurement of some granite paving-work not supervised by this department, on Baldwin, Burbank, Bristol, D, Chambers, Merrimac, Oak, Richards, and Wapping streets.

The total amount of work measured by the Surveying Division for the Street Department during the year is as follows:

Edgestone set and reset, lin. ft. . . .	129,382
Block-stone paving, sq. yds.	60,473
Round-stone paving (gutters), sq. yds. . .	32,941
Brick sidewalk paving, sq. yds. . . .	68,701
Artificial stone sidewalks, sq. yds. . . .	12,295
Asphalt paving, sq. yds.	1,297
Coal-tar concrete walks, sq. yds. . . .	183

MISCELLANEOUS WORK AND CONSTRUCTION IN 1895.

CHARLES-RIVER BRIDGE.

A contract was made, June 14, 1895, with J. N. Hayes & Co., for repairing the draw foundation of this bridge. Plans and specifications were furnished by this department.

Twenty-six new spruce piles were driven in the foundation, and capped with hard-pine caps; two main lines and part of the rear line, of track-stringers were replaced with new hard-pine sticks, bolted and keyed together, and bolted to caps. Four lines of rails were spiked to the main lines of track-stringers, and two to the rear line. The old trucks under the heavy bearings were replaced by trucks taken from the old draws at Dover-street bridge. They were thoroughly overhauled, and placed in position by blocking up the draw. Six oak piles were driven on the Charlestown side of the channel, on the down-stream end of the draw-landing, and capped, so as to secure a good landing for the draw. The channel-faces of the fender-guards were also repaired. The total cost of the entire work done was $4,259.51.

CHELSEA BRIDGE, FROM CHARLESTOWN TO CHELSEA.

The work of abolishing the grade crossings on the Mystic wharves by the Boston & Maine R.R., and mentioned in the last annual report, has been completed during the year.

In connection with this work the city has rebuilt the North draw and its foundations, over the Mystic river, as the old draw was in a decayed and dangerous condition.

On May 23, 1895, a contract was made with Augustus Bellevue & Co., of Boston, to rebuild the draw foundation in accordance with plans and specifications furnished by this department, the contract price being $19,260.

The draw foundation is built of hard-pine lumber, supported by new oak piles. Under this contract the down-stream pier was extended for a length of 60 feet, and the up-stream pier for a length of 50 feet; the bridge on the Chelsea side of the draw was rebuilt for a length of 21 feet, and on the Charlestown side of the draw for an average length of 33 feet, the roadway being paved with granite blocks.

The woodwork for a length of about 53 feet adjoining the above work on the Charlestown side was also rebuilt above the piles by Augustus Bellevue & Co., under an accepted proposal, for $1,200; the granite-block paving on this part of the bridge being done by the Boston & Maine R.R.

The old draw has been replaced with a new steel draw of the retractile type, with three lines of main plate girders. The draw is 49 feet 11 inches wide between centres of outside railings, and has two roadways and one sidewalk. The draw is operated by an electric motor attached to it, the electric current being taken, by means of a trolley, from a wire supported on the draw foundation.

The draw machinery is operated from a controller attached to the middle samson post of the draw. Hand or horse power can also be used for moving the draw.

The superstructure of the draw was built and erected by the Penn Bridge Company, of Beaver Falls, Penn., and the trucks built by the Atlantic Works.

The motor and electrical work was furnished by the General Electric Company, and the gearing and other machine-work by Miller & Shaw. The draw and its appurtenances were designed by this department.

Previous to the rebuilding of the old draw by the city, team and foot travel was stopped on this bridge on account of the rebuilding of the approach to the viaduct by the Boston & Maine R.R. This was considered a good opportunity to replace the old draw and its foundations, the Lynn & Boston R.R. making provision for electric-car travel by the extension of the temporary bridge and constructing a new temporary draw over the channel, on the up-stream side of the old draw.

The new steel draw was first run on by electricity on December 26, 1895, and travel was resumed over the bridge on December 28, 1895.

The total cost charged to this appropriation to February 1, 1896, was $33,827.91.

Chelsea-street Bridge.

As mentioned in the last annual report, the pile structure was rebuilt by B. F. Nay & Co., and the steel draw was built by the Boston Bridge Works. The bridge was opened to team-travel February 26, 1895. The cost of the contract-work on the pile bridge was $15,241.53; on the steel draw, $8,450. The sheathing of the bridge and draw was done by the Bridge Division.

COTTAGE FARM BRIDGE (OVER THE BOSTON & ALBANY RAILROAD).

During the past year the following work has been done on the northerly section of the bridge: The middle pier has been extended 210 feet 6 inches, and the parapets on the abutments set by David S. Crockett & Co., the stone for the parapets being furnished by the Cape Ann Granite Company; two steel girders have been built and set in position by the Boston Bridge Works; 20-inch steel beams have been furnished by Page, Newell, & Co., but are not yet in place; and hollow bricks and skewbacks have been furnished by the Boston Fire Proof Company.

GOLD-STREET BRIDGE.

Under an order from the Street Department, dated May 13, 1895, plans and specifications were prepared for a bridge over the tracks of the New York & New England Railroad at Gold street.

A contract for the abutments was made with Frank H. Blaisdell, dated June 11, 1895, for the sum of $1,850, and subsequently an agreement was made with him for building two short return-walls at the ends of the west abutment. Work was begun July 1, and completed about January 1. The total amount paid under these two agreements was $2,333.45.

A contract was made with the Boston Bridge Works, dated June 11, 1895, for the superstructure of the bridge, for the sum of $1,570, and the work was completed January 20, 1896.

This department was also requested to see that the work of raising the building on the northerly side of Gold street, adjoining the east abutment, was carried out in accordance with an agreement made by the Street Department with F. H. Blaisdell, dated September 18, 1895. This work was finished early in January, satisfactory to the Building Department, and a final estimate made January 24, 1896, for the sum of $2,082.37.

CITY HOSPITAL GROUNDS.

Plans and specifications have been prepared for the grading of a portion of the City Hospital grounds, building drains and building boundary walls, also surfacing drives and walks.

The work is ready for advertising for proposals.

Highland Park.

During the fall of the past year considerable work has been done at Highland park, or old Fort square, Roxbury, from plans furnished by Messrs. Olmstead, Olmstead, & Eliot. The design is to restore the Old Fort up to the level of the interior platform, omitting the parapet, thus forming an elevated playground or concourse in accord with the aspect of a fortification. In other parts of the grounds walks will be provided, forming a complete circuit within the boundary, with widenings in the recesses between the bastions. The surface of the remaining spaces will be covered with low bushes, vines, and creepers. Considerably more than half the work contemplated has been done, a suitable retaining-wall has been built on Fort avenue, and the grading and walks on the north side of the grounds have been practically completed; the rough grading of the Old Fort has been nearly finished to the level of the platform; the standpipe has been painted and repaired.

A model was prepared by Mr. J. W. McClintock, Civil Engineer, based upon the lines shown on a contour plan made of the grounds in and upon such other data as could be collected. The plan of the grounds showed plainly the location of two of the bastions of the Old Fort.

With the approval of His Honor the Mayor the model was donated to the Bostonian Society, September 20, 1895.

The total cost of the work done under the direction of this department was $6,306.06.

East Boston Ferries.

Middle Pier, North Ferry. March 27, 1895, a contract was made with W. H. Ellis & Co., for extending the middle pier at the East Boston side of the North Ferry. The pier was extended 30 feet, at a cost for contract work of $1,775.60.

New Drop, South Ferry. A contract was made by the Superintendent of Ferries, June 20, 1895, with William McKie, to build a new ferry drop to replace the old one at the southerly side of the Boston landing of the South Ferry, for $5,611. The old drop was delivered to the Ferry Division, its machinery being removed to the new drop, and the necessary changes of the foundation and landing being made.

Temporary Foot-bridge at Roxbury Crossing.

A wooden foot-bridge was built over the tracks of the New York, New Haven, & Hartford Railroad at Roxbury Crossing,

on Tremont street, under a contract with Josiah Shaw, dated June 11, 1895, at a cost of $981.

WEST NEWTON-STREET BULKHEAD.

A timber bulkhead was built across the end of West Newton street abutting on the line of the Boston & Albany Railroad, under a contract with A. Bellevue & Co., for the sum of $344.

WIDTHS OF DRAW-OPENINGS.

The table showing the widths of draw-openings in the bridges over tide-water in this city is given in Appendix A. The openings have all been remeasured for this report.

Respectfully submitted,

WILLIAM JACKSON,
City Engineer.

CITY ENGINEERS.

1850–1895.

E. S. CHESBROUGH, M. Am. Soc. C. E.,
Nov. 18, 1850, to Oct., 1855.
(Died August 18, 1886.)

JAMES SLADE,
Oct. 1, 1855, to April 1, 1863.
(Died August 25, 1882.)

N. HENRY CRAFTS,
April 1, 1863, to Nov. 25, 1872.

JOSEPH P. DAVIS, M. Am. Soc. C. E.,
Nov. 25, 1872, to March 20, 1880.
(Resigned March 20, 1880.)

HENRY M. WIGHTMAN, M. Am. Soc. C. E.,
April 5, 1880, to April 3, 1885.
(Died April 3, 1885.)

WILLIAM JACKSON, M. Am. Soc. C. E.,
April 21, 1885, to the present time.

APPENDIX A.

Table showing the Widths of Openings for Vessels in all Bridges provided with Draws, in the City of Boston, January, 1896.

Name of Bridges.	Location.	Number of Openings.	Width.	
			Feet.	In.
Boston & Maine R.R.	Boston to Charlestown	1	39	7
" " "	Over Miller's River	1	36	0
Broadway	Over Fort-point Channel	1	43	3
Cambridge-st.	Brighton to Cambridge	1	36	3
Canal	Boston to East Cambridge	1	36	1
Charles-river	Boston to Charlestown	1	36	0
Chelsea (South Channel)	Charlestown to Chelsea	1	38	9
" (North ")	" " "	1	44	10
Chelsea-st. (East Boston side)	East Boston to Chelsea	2	36	0
" (Chelsea side)	" " "	. . .	36	0
Commercial-point	Dorchester	1	24	0
Congress-st. (Boston side)	Over Fort-point Channel	2	43	3
" (So. Boston side)	" " "	. . .	43	11
Dover-st.	" " "	1	36	10
Eastern R.R.	Boston to Charlestown	1	39	8
" "	Over Miller's River	1	35	6
Essex-st.	Brighton to Cambridge	1	35	9
Federal-st.	Over Fort-point Channel	1	41	10
Fitchburg R.R.	Boston to Charlestown	1	36	0

Fitchburg R.R. (for teaming freight)	Boston to Charlestown	1	36	0
Grand Junction R.R.	Brighton to Cambridge	1	35	9
" " "	East Boston to Chelsea	1	34	6
Granite	Dorchester to Milton	1	36	0
Harvard (Boston side)	Boston to Cambridge	2	36	6
" (Cambridge side)	" " "		36	8
L-street	Over Reserved Channel, South Boston	1	40	0
Lowell R.R. (freight)	Boston to East Cambridge	1	40	2
" " (passenger)	" " " "	1	39	7
Malden	Charlestown to Everett	1	43	2
Meridian-st. (East Boston side)	East Boston to Chelsea	2	59	2
" (Chelsea side)	" " " "		59	0
Mt. Washington-ave. (Boston side)	Over Fort-point Channel	2	42	3
" " (So. Boston side)	" " "		42	3
Neponset	Dorchester to Quincy	1	36	0
New York & New England R.R. (Boston side)	Over Fort-point Channel	2	41	9
" " " (So. Boston side)	" " "		40	9
" " "	Over South Bay	1	28	4
North Beacon-st.	Brighton to Watertown	1	30	0
North Harvard-st.	Brighton to Cambridge	1	36	0
Old Colony R.R.	Over Fort-point Channel	1	36	4
" "	Dorchester to Quincy	1	36	0
Prison-point	Charlestown to Cambridge	1	36	0
Warren	Boston to Charlestown	1	36	2
West Boston (Boston side)	Boston to Cambridge	2	36	6
" (Cambridge side)	" " "		36	1
Western-ave.	Brighton to Cambridge	1	36	0
"	Brighton to Watertown	1	35	10

APPENDIX B.

TABLE OF ACCIDENT AND OTHER PLANS MADE FOR THE LAW DEPARTMENT, FROM FEBRUARY 1, 1895, TO JULY 1, 1895.

Boston Proper.

Appleton Street. — Plan of street in front of No. 42.
Battery Street. — Plan of street at corner of Commercial street.
Berwick Park. — Plan of, in front of No. 10.
Boylston Street. — Plan of street on southerly side in front of old Public Library building.
Church Street. — Plan of street at corner of Boylston street.
Clarendon Street. — Plan of street in front of No. 24.
Columbus Avenue. — Plan of, in front of No. 182.
Columbus Avenue. — Plan of, at southeast corner of Camden street.
East Concord Street. — Plan of street in front of No. 13.
Friend Street. — Plan of street in front of Nos. 150, 154.
Green Street. — Plan of street in front of Nos. 10, 12.
Hanover Street. — Plan of street, corner of North Centre street.
Hanover Street. — Plan of street near corner of Sigourney place.
Hanover Street. — Plan of street in front of No. 372.
Harrison Avenue. — Plan of, near Stoughton street.
Huntington Avenue. — Plan of, in front of No. 86.
Isabella Street. — Plan of street in front of Presbyterian church.
Joy Street. — Plan of street in front of No. 13.
Kneeland Street. — Plan of street in front of Nos. 104, 110.
Lynde Street. — Plan of street at corner of Green street.
Massachusetts Avenue. — Plan of, near Albany street.
Merchants Row. — Plan of, in front of No. 44.
Milk Street. — Plan of street at corner of Hawley street.
Northampton street. — Plan of street at corner of Tremont street.
Northampton Street. — Plan of street at southwest corner of Columbus avenue.
Shawmut Avenue. — Plan of, near Brookline street.
Summer Street. — Plan of street at corner of South street.
Travers Street. — Plan of street in front of No. 80.
Tremont Street. — Plan of street in front of No. 266.
Tremont Street. — Plan of street in front of No. 782.
Tremont Street. — Plan of street at corner of Northfield street.
Washington Street. — Plan of street at corner of Avon street.

South Boston.

K Street. — Plan of street in front of No. 64.
West First Street. — Plan of street in front of Nos. 421, 423.
West Third Street. — Plan of street in front of No. 164.
West Fourth Street. — Plan of street in front of No. 436.

CHARLESTOWN.

Bow Street. — Plan of street at corner of Washington street.
Henley Street. — Plan of street from Park street to Main street.
Perkins Street. — Plan of street at corner of Cambridge street.

ROXBURY.

Hampshire Street. — Plan of street at corner of Culvert street.
Huntington Avenue. — Plan of, in front of House of Good Shepherd.
Leon Street. — Plan of street in front of No. 24.
Rockland Street. — Plan of street in front of No. 55.
Roxbury Street. — Plan of street in front of No. 104.
Tremont Street. — Plan of street in front of No. 1485.
Walnut Avenue. — Plan of, at corner of Circuit street.
Warren Street. — Plan of street at corner of Taber street.

DORCHESTER.

Cushing Avenue. — Plan, near Upham's Corner.

MEDFORD.

Boston Avenue. — Plans of, in Medford.

OTHER PLANS FOR LAW DEPARTMENT.

Essex Street. — From Beach street to South street, plan of, showing estates.
Harrison Avenue. — From Essex street to Beach street, plan of, showing estates.
Tremont Street. — At the corner of Boylston street, copy of plan showing widening on the Common.

ACCIDENT PLANS MADE FOR THE LAW DEPARTMENT, FROM JULY 1, 1895, TO JANUARY 31, 1896.

BOSTON PROPER.

Blackstone Street. — Plan of street in front of No. 133.
Boylston Street. — Plan of street at the corner of Church street.
Boylston Street. — Plan of street, northerly side opposite old Public Library building.
Broadway. — Plan of, in front of No. 16.
Cambridge Street. — Plan of street in front of No. 204.
Chandler Street. — Plan of street in front of No. 69.
Columbus Square. — Plan of, in front of No. 4.
Court Street. — Plan of street in front of No. 61.
Derne Street. — Plan of street in front of No. 32.
Eastern Avenue. — Plan of, in front of No. 27.
Friend Street. — Plan of street at the corner of Market street.
Hanover Street. — Plan of street in front of No. 273.
Haymarket Square. — Plan of, near Washington street.
Joy Street. — Plan of street in front of No. 14.
Merrimac Street. — Plan of street in front of Nos. 131, 133.
Phillips Street. — Plan of street in front of No. 65.

Prince Street. — Plan of, in front of No. 93.
Russell Place. — Plan of, in front of Nos. 1, 2.
Shawmut Avenue. — Plan of, at corner of Rutland street.
Stoddard Street. — Plan of street in front of No. 3.
St. James Avenue. — Plan of, in front of No. 13.
Sun Court Street. — Plan of street in front of No. 3.
Winter Street. — Plan of street in front of No. 17.

South Boston.

Dorchester Street. — Plan of street in front of No. 21.
West Second Street. — Plan of street in front of No. 404.

Charlestown.

Devon Street. — Plan of street in front of No. 80.
Main Street. — Plan of street in front of No. 427.

Roxbury.

Adams Street. — Plan of street in front of No. 46.
Albany Street. — Plan of street in front of No. 825.
Bower Street. — Plan of street in front of Nos. 8, 10.
Centre Street. — Plan of street in front of No. 8.
Prentiss Street. — Plan of street in front of No. 10.

Dorchester.

Bruce Street. — Plan of street near Dracut street.
Gleason Street. — Plan of street in front of Harvard Congregational Church.
McLellan Street. — Plan of street near White street.
Minot Street. — Plan of street near Glide street.
Parkman Street. — Plan of street in front of No. 9.

Winthrop.

Main Street. — Plan of street at bridge in Winthrop.

APPENDIX C.

TABLE SHOWING SURVEYS, PLANS AND PROFILES MADE BY THE SURVEYING DEPARTMENT, FROM FEBRUARY 1, 1895, TO JULY 1, 1895.

BOSTON PROPER.

Atlantic Avenue. — Plan of encroachment at T wharf.

Bay State Road. — Plan and profile of laying out and grade from Sherborn street to Granby street.

Beacon Street. — Plan of proposed widening from Tremont street to Tremont place.

Bendall's Lane. — Plan of relocation.

Belvidere Street. — Plan of Mechanic Arts High School, for Superintendent of Public Buildings.

Boston. — Plan of Boston proper, showing changes in street and wharf lines, 1795 to 1895. A copy accompanies this report.

Carlton Street. — Plan and profile from Yarmouth street to Massachusetts avenue.

Commercial Street. — Plan of encroachment, corner of Hanover street.

Cotting Street. — Plan and profile of grade from Leverett street to Lowell street.

Granby Street. — Plan and profile of laying out and grade from Commonwealth avenue to Charles river.

India Square. — Plan of proposed widening.

India Street. — Plan of relocation between India square and Atlantic avenue.

Irving Street. — Plan and profile of grade at Bowdoin-school lot.

Laconia Street (formerly Ashland place). — Plan and profile of laying out and grade from Washington street to Harrison avenue.

Norway Street. — Plan for construction assessment from Falmouth street to Massachusetts avenue.

Pemberton Square. — Plan of Court House, for Superintendent of Public Buildings.

Prince Street. — Plan of proposed addition to Hancock-school lot.

Proposed Street. — Plan and profile of proposed laying out and grade from Boylston street to Lansdowne street.

South Russell Street. — Plan and profile for grade at Bowdoin-school lot.

State Street. — Plan showing lines around Brazers Building.

St. Germain Street. — Plan for construction assessment from Dalton street to Massachusetts avenue.

Tremont Street. — Plan of proposed widening from Beacon street to Park street.

Tyler Street. — Plan and profile of grade between Beach street and Harvard street.

Washington Street. — Plan of territory bounded by Shawmut avenue, Dover street, and Groton street, for Park Department.

South Boston.

Dorchester Street. — Plan showing encroachment between West Sixth street and Tudor street.

East Boston.

East Boston Terminal. — Two large plans showing proposed change of railroad locations.

Gove Street. — Plan of proposed addition to school lot.

Charlestown.

Dorrance Street. — Plan of passageway to Beacham street.

Pine Street. } — Plan of proposed addition to school lot.
Vine Street. }

Roxbury.

Abbotsford Street. — Plan and profile of laying out and grade from Walnut avenue to Crawford street.

Alleghany Street. — Plan and profile of proposed laying out and extension from Parker street to St. Alphonsus street, with grade.

Comins Terrace. — Plan and profile of laying out and grade from Bower street to Munroe-school lot.

Fenno Street. — Plan and profile of laying out and grade from Buena Vista street to Rockland street.

Intervale Street. — Plan and profile of proposed laying out and grade from Blue Hill avenue eastwardly.

Parker Hill Avenue. — Plan and profile of proposed revision of grade from Huntington avenue to Hillside street.

Prentiss Place. — Plan and profile of proposed laying out, widening, and extension from Linden Park street to Cabot street, with grade.

Ruggles Street. — Plan and profile of proposed revision of grade from Tremont street to Columbus avenue.

Wyoming Street. — Plan and profile of proposed extension to Humboldt avenue, with grade.

Dorchester.

Bloomfield Street. — Plan and profile of proposed laying out and grade from Geneva avenue to Greenbrier street.

Ellet Street. — Plan and profile of proposed laying out and grade from Blue Hill avenue to New York & New England Railroad.

Harvest Street. — Plan of proposed school lot.

King Street and Adams Street. — Plan of proposed school lot.

Lauriat Avenue. — Plan of laying out and grade from Blue Hill avenue to New England Railroad.

WEST ROXBURY.

Arundel Street. — Plan and profile of proposed laying out and grade from Walter street to Selwyn street.

Kirk Street. — Plan and profile of proposed laying out and grade from Montview street to Crest street.

BRIGHTON.

Cambridge Street. — Plan and profile of widening with grade from Harvard avenue to Linden street.

Commonwealth Avenue. — Plan of land belonging to the City of Boston, at the corner of Chestnut Hill avenue.

TABLE OF SURVEYS, PLANS AND PROFILES MADE BY THE SURVEYING DIVISION OF THE ENGINEERING DEPARTMENT, FROM JULY 1, 1895, TO FEBRUARY 1, 1896.

BOSTON PROPER.

Albany Street. — Approximate plan of proposed widening from Lehigh street to Troy street.

Audubon Road. — Plan for construction assessment from Beacon street to Ivy street.

Bay State Road. — Plan for construction assessment from Sherborn street to Granby street.

Boylston Street. — Plan for construction assessment from Back Bay Fens to Brookline avenue.

Chambers Street. — Approximate plan for proposed school-house site between Poplar street and Allen street.

Charlestown Street. — Approximate plan of proposed widening from Haymarket square to Causeway street.

Clinton Street. — Plan and profile of widening with grade, from Commercial street to Fulton street, seventy feet wide.

Clinton Street. — Plan and profile of proposed widening with grade, from Commercial street to Fulton street, eighty feet wide.

Commonwealth Avenue. — Plan showing trees from Arlington street to Clarendon street.

Cross Street. — Approximate plan of proposed widening and extension to Haymarket square.

Granby Street. — Plan for construction assessment from Commonwealth avenue to Charles river.

Harrison Avenue. — Plan for Law Department from Essex street to Beach street.

Kenmore Street. — Plan for construction assessment from Commonwealth avenue to Newbury street.

Parker Street. — Plan for construction assessment from Westland avenue to Huntington avenue.

Prince Street. — Plan of proposed school-house site near Bennet avenue.

St. Botolph Street. — Plan and profile of proposed laying out and grade, from Massachusetts avenue to Gainsboro' street.

Sherborn Street. — Plan for construction assessment from Commonwealth avenue to Charles river.

State Street. — Plan showing lines around Brazers Building.

Turner Street. — Plan for construction assessment from Haviland street to Astor street.

South Boston.

Congress Street. — Plan and profile of proposed widening from A street to L street.

G Street and East Fourth Street. — Plan of proposed High-school lot.

I Street. — Plan of encroachment at No. 134.

Mt. Washington Avenue. — Approximate plan of proposed extension to A street.

West Fourth Street. — Silver street and E street, plan of proposed addition to Bigelow-school lot.

East Boston.

Lewis Street. — Approximate plan of proposed widening from Webster street to South Ferry.

Maverick Street. — Plan of encroachment at No. 374.

Wordsworth Street. — Plan and profile of proposed laying out and grade, from Saratoga street to Pope street.

Charlestown.

Elm Street. — Approximate plan of proposed extension to Mystic river.

Lynde Avenue. — Approximate areas for proposed street.

Quincy Street. — Plan and profile for proposed laying out and grade, from Bunker Hill street to Medford street.

Stetson Court. — Approximate plan of proposed extension to Park street.

Roxbury.

Abbotsford Street. — Plan for construction assessment from Walnut avenue to Harold street.

Amory Street. — Plan and profile showing grade from Centre street to Amory avenue.

Brunswick Street. — Plan and profile of proposed laying out and grade east from Blue Hill avenue.

Columbus Avenue and Tremont Street. — Plan and profile for proposed change of grade at New York, New Haven & Hartford Railroad.

Devon Street. — Plan and profile of proposed laying out and grade east from Blue Hill avenue.

Dudley Street. — Plan of widening between Mt. Pleasant avenue and Mt. Pleasant place.

New Heath Street. — Plan and profile with revised grade at east side of Columbus avenue.

Oswald Street. — Plan and profile of proposed laying out and grade from Calumet street to Hillside street.

Parker Hill Avenue. — Plan and profile with revised grade from Huntington avenue to Hillside street.

St. Alphonsus Street. — Plan for construction assessment from Tremont street to Calumet street.

Tremont Street. — Plan of proposed relocation from Linden Park street to Texas street.

Windsor Street. — Plan of discontinuance of part not included in the extension of Columbus avenue.

DORCHESTER.

Athelwold Street. — Plan and profile of proposed laying out and grade from School street to Kilton street.

Blue Hill Avenue. — Plan and profile of relocation and grade from Seaver street to Canterbury street.

Bowdoin Avenue. — Plan of school-house and lot.

Bradshaw Street (formerly White street). — Plan and profile of proposed laying out and grade from Glenway street to Charlotte street.

Burbank Street. — Plan and profile of proposed laying out and grade from Washington street to Merrill street.

Centre Street. — Plan and profile of widening with grade from Washington street to Geneva avenue.

Cook Street. — Plan and profile of proposed laying out and grade from Washington street to Chamberlain street.

Draper Court. — Plan and profile of proposed laying out and grade from Bowdoin street to Coleman street.

Draper Court. — Plan and profile of proposed laying out and extension with grade from Bowdoin street to Clark street.

East Street. — Plan of school-house lot for architect.

Edwin Street. — Plan and profile of proposed laying out and grade from Dorchester avenue to Shawmut park.

Fowler Street. — Plan and profile of proposed laying out and grade from Glenway to Greenwood street.

Gawain Street. — Plan and profile of proposed laying out and grade from Harvard street to Park street.

Geneva Avenue. — Plan for construction assessment from Dorchester avenue to Westville street.

Granger Street. — Plan and profile of proposed extension and grade to Dorchester avenue.

Granger Street. — Approximate plan of extension through Leonard place and Gordon place to Dorchester avenue.

Greenbrier Street. — Plan and profile of laying out and grade from Bowdoin street to Bloomfield street.

Greenwood Street. — Plan and profile of proposed laying out and grade from Fowler street to Elmo street.

Greenwood Street. — Plan and profile of proposed laying out and grade from Elmo street to Harvard street.

Harbor View Street. — Plan of proposed addition to school-house lot.

Josephine Street. — Plan for construction assessment from Ditson street to Geneva avenue.

Kingsdale Street (formerly Coolidge avenue). — Plan and profile of laying out and grade from Standish street westerly.

Lauriat Avenue. — Plan for construction assessment from Blue Hill avenue to Thatcher street.

Leeds Street. — Plan and profile of proposed laying out and grade from Savin Hill avenue to Bay street.

Mellen Street. — Plan and profile of proposed laying out and grade from Ocean street to Montague street.

Mill Street. — Plan of proposed addition to Harris-school lot.

Millet Street. — Plan and profile of proposed laying out and grade from Harvard street to Park street.

Morton Street. — Plan of school-house and lot near Norfolk street.

Morton Street. — Plan and profile of proposed widening and grade from New England Railroad to Norfolk street.

Pleasant Street. — Plan of proposed relocation from East Cottage street to Stoughton street.

Ramsey Street. — Plan and profile of proposed laying out and grade from Dudley street to Hamlet street.

Rosseter Street. — Plan and profile of proposed extension and grade from Bullard street to Bowdoin avenue.

Robinson Street. — Plan of school lot, with grades, for architect.

Shawmut Park. — Plan and profile of proposed laying out and grade from King street to Templeton street.

Talbot Avenue. — Plan of proposed high-school lot, corner of Centre street.

Thane Street. — Plan and profile of proposed laying out and grade from Harvard street to Park street.

Washington Street. — Plan and profile of proposed relocation and grade from Norfolk street to Fuller street.

Wilder Street. — Plan and profile of proposed laying out from Washington street to Geneva avenue.

Wolcott Street. — Plan and profile of proposed laying out and grade from Columbia street to Erie street.

West Roxbury.

Back Street. — Approximate plan and profile of proposed grade from Blue Hill avenue to Austin street.

Boylston Avenue. — Plan and profile of revised grade north from Green street.

Brookside Avenue. — Plan and profile of revised grade from Green street to Stony Brook.

Calder Street. — Plan and profile of proposed laying out and grade from Blue Hill avenue to Canterbury street.

Canterbury Street. — Plan and profile of proposed grade from Blue Hill avenue to Angell street.

Fairview Street. — Plan and profile of grade from Proctor street to Mendum street.

Green Street. — Plan and profile of revised grade from Brookside avenue to Boylston avenue.

Hewlett Street. — Plan of proposed school-house lot, corner of Walter street.

Hewlett Street.— Plan of school-house lot, corner of Walter street, showing grades for architect.

Jones Street. — Plan and profile of proposed laying out and grade from Fairview street to Walter street.

Mendum Street. — Plan and profile of proposed laying out and grade from Fairview street to Walter street.

Park Street. — Plan and profile of proposed laying out and grade from Centre street to Montview street.

Stratford Avenue. — Plan and profile of proposed laying out and grade from Anawan avenue to the N.Y., N.H., & H. R.R.

BRIGHTON.

Bayard Street. — Plan and profile of proposed laying out and grade from North Harvard street to Kenneth street.

Cambridge Street. — Plan showing addition to Allston Grammar-school lot.

Cambridge Street. — Plan showing widening at the corner of Henshaw street.

Chestnut Hill Avenue. — Plan and profile of proposed widening and grade from Beacon street to South street.

Chiswick Road. — Plan of school-house lot, corner of Chestnut Hill avenue.

Harvard Avenue. — Plan for construction assessment from Commonwealth avenue to Brookline line.

Kenneth Street. — Plan and profile of proposed laying out from Franklin street to beyond Bayard street.

South Street. — Plan and profile of proposed widening and grade from Chestnut Hill avenue to Commonwealth avenue.

Weitz Street. — Plan and profile of proposed laying out and grade from Franklin street to Bayard street.

APPENDIX D.

TABLE OF PLANS FOR SIDEWALK ASSESSMENTS MADE FOR PAVING DIVISION OF STREET DEPARTMENT, FROM JULY 1, 1895, TO FEBRUARY 1, 1896.

Boston Proper.

Commonwealth Avenue. — South side between Beacon street and Essex street, at Cottage Farm.
Parker Street. — Between Boylston street and Westland avenue.
Warren Avenue. — Southeast side between Berkeley street and Dartmouth street.
Washington Street. — At No. 1046.

South Boston.

Baldwin Street. — Between B street and Granite street.
Richards Street. — Between A street and Granite street.
West Eighth Street. — Northerly corner of D street, Nos. 118 and 120.

Roxbury.

Alaska Street. — Southwest side.
Gaston Street. — South side from angle to Blue Hill avenue.
Gaston Street. — Southwest corner of Warren street.
Hammond Street. — Nos. 10 to 16.
Harold Street and Homestead Street. — Easterly corner.
Hazelwood Street. — Between Munroe street and Townsend street.
Howland Street and Elm Hill Avenue. — Northerly corner.
Maywood Street. — Between Warren street and Blue Hill avenue.
Quincy Street. — Northeast side from Warren street to Blue Hill avenue.
Sterling Street. — From Shawmut avenue to No. 61.
Sterling Street. — At No. 84.
Townsend Street. — Warren street to Harold street.

Dorchester.

Adams Street. — Between Minot street and Frederika street.
Alban Street. — Between Ashmont street and Welles avenue.
Bicknell Street. — At Nos. 35 and 37.
Kenwood Street. — Between Washington street and Allston street.
Roslin Street. — Between Washington street and Harley street.
Talbot Avenue. — Between Washington street and Welles avenue.
Tremlett Street. — Near Hooper street.

WEST ROXBURY.

Perkins Street. — Corner of Jamaicaway.
South Street. — Between Brookfield street and South Walter street.

CHARLESTOWN.

Mishawum Street. — Between Main street and Rutherford avenue.

LIST OF STREETS WHERE LOT FRONTAGES HAVE BEEN OBTAINED FOR THE SEWER DIVISION OF THE STREET DEPARTMENT FOR SEWER ASSESSMENTS FOR THE YEAR 1895.

CHARLESTOWN.

Chelsea Street. —Westerly side from Medford street to Scotts court.
Lawrence Street. — From Union street to Austin street.

EAST BOSTON.

Chelsea Street. — At and near Prescott street.
Marion Street. — From Bennington street to Havre street.
Saratoga Street. — From Bennington street to Austin avenue.

SOUTH BOSTON.

Dorchester Avenue. — From Fort Point Channel to West Broadway.
Gold Street. — From A street to B street.

CITY PROPER.

Butler Square. — From Chatham street to Butler row.
Chambers Street. — From Auburn street to Brighton street.
Curve Street. — From Tyler street to Hudson street.
Harvard Street. — From Washington street to Hudson street.
Merrimac Street. — From Portland street to Staniford street.
North Margin Street. — From Cooper street to Thacher street.
Noyes Place. — From Salem street westerly.
Prince Street. — At corner of Salem street.
Salem Street. — From Noyes place to Prince street.
Tyler Street. — From Oak street to Curve street.

ROXBURY.

Audubon Road. — From Beacon street to Ivy street.
Comins Terrace. — From Bower street.
Dalmatia Street. — From Blue Hill avenue to Dacia street.
Fenno Street. — From Buena Vista avenue to Rockland street.
Gerard Street. — From Norfork avenue to Massachusetts avenue.
Heath Street. — From Lawn street to Day street.
Humboldt Avenue. — From Munroe street to Townsend street.
Munroe Street. — From Humboldt avenue to Walnut avenue.
Parker Hill Avenue. — Near Sunset street.
Whiting Street. — From Moreland street westerly.

Dorchester.

Adams Street. — From King street to Lonsdale street.
Centre Street. — From Adams street to a point 630 feet westerly.
East Cottage Street. — From Dorchester avenue to a point near Boston street.
Glenway Street. — From Erie street to a point 300 feet southerly from Page avenue.
McLellan Street. — From Blue Hill avenue to Page avenue.
Parkway. — From Dorchester avenue to Pond street.
Pond Street. — From East Cottage street to Parkway.
Tremlett Street. — From Hooper street to a point 200 feet eastwardly.
White Street. — From Glenway street to Bicknell street.

West Roxbury.

Angell Street. — From Blue Hill avenue to Canterbury street.
Corey Street. — From Montview street to Vermont avenue.
Hewlett Street. — From Centre street to Walter street.
Jamaicaway. — From Perkins street to Pond street.
Landseer Street. — From Bellevue street southerly.
Oriole Street. — From Bellevue street to Wren street.
South Street. — From Keyes street to Parkway.
Sylvia Street. — From Washington street to Forest Hills street.
Weld Street. — From Willow street to Maple street.
Wren Street. — From Oriole street to Rutledge street.

Brighton.

Bigelow Street. — From Faneuil street to the bend.
Cambridge Street. — From Cambridge terrace to point south of Union square.
Cambridge Street. — From Warren street to point north of Dustin street.
Lake Street. — From Washington street to Commonwealth avenue.
Nonantum Street. — From Oak square to the Newton line.
North Beacon Street. — From Everett street to Gordon street.
Strathmore Road. — From Chestnut Hill avenue to Englewood avenue.
Sutherland Road. — From Selkirk road to Kinross road.
Tremont Street. — From Oak square to the Newton line.
Washington Street. — From Tremont street to the Newton line.

APPENDIX E.

Engineering Department Property Schedule, Main Office.

1 horse.
2 carriages.
1 sleigh.
2 harnesses.
3 robes.
Instruments for drawing.
Instruments for surveying, as follows:
1 Temple transit.
5 Buff & Berger transits.
8 Gurley transits.
1 Stackpole transit.
2 Temple levels.
4 Buff & Berger levels.
5 Gurley levels.
11 Boston rods.
3 New York rods.
4 Troy rods.
Cases for plans and books.
Reference Library, 1,012 volumes.
9,406 Plans Engineering Works, loose.
14 volumes Plans Engineering Works, bound.
Photographs of Engineering Works.
Apparatus for blue printing.
1 microscope.
1 mercurial barometer.
1 aneroid barometer.
1 holosteric barometer.
1 set hydrometers.
1 hygrometer.
1 pair field-glasses.
2 typewriters.
2 dynamometers.
1 pentagraph.
1 calculating-machine.
1 volt meter.
1 comptometer.
2 thermophones.

Surveying Division.

3 Temple transits.
2 Moody transits.
2 Buff & Berger transits.
3 Stackpole transits.
1 Troughton & Sims transit.
1 Poole transit.
1 Archibut transit.
1 Ring transit.
5 Buff & Berger levels.
1 Moody level.
2 Temple levels.
1 Ewing level.
1 Gurley level.
7 Rods.

APPENDIX F.

Elevations referred to Boston city base. (The city base is 0.64 feet below mean low tide.)

Feet.

0.00 City base.
15.66 Highest tide, April 16, 1851.
15.33 Coping of dry dock, Charlestown Navy Yard.
12.24 Greatest elevation of high tide, per United States Tide-Tables, April 29 and November 6, 1896 (11.6 + 0.64) = 12.24.
8.24 Least elevation of high tide, per United States Tide-Tables, January 24 and August 3 and 4, 1896 (7.6 + 0.64) = 8.24.
2.84 Greatest elevation of low tide, per United States Tide-Tables, September 1, 1896 (2.2 + 0.64) = 2.84.
— 1.36 Least elevation of low tide, per United States Tide-Tables, November 6, 1896 (— 2.0 + 0.64) = — 1.36.
0.64 Mean low tide.
5.00 Piles cut off for building.
9.91 Water-works base (approximate tide-marsh level).
[1]—4.98 Cambridge city base.
0.38 South Boston flats base.

[1] Cambridge city base is 4.98 feet below Boston city base.

APPENDIX G.

ENGINEERING DEPARTMENT ANNUAL REPORTS, 1867–1896.

No. of Reports.	For the Year.	Year published and No. City Document.	No. of Reports.	For the Year.	Year published and No. City Document.
First	1867	1868 — 22	Eighteenth	*1884	1885 — 54
Second and Third	1868–69	1870 — 14	Nineteenth	1885	1886 — 41
Fourth	1870	1871 — 15	Twentieth	*1886	1887 — 38
Fifth and Sixth	*1871–72	1873 — 23	Twenty-first	1887	1888 — 39
Seventh	*1873	1874 — 20	Special report	1888	1888 — 117
Eighth	1874	1875 — 19	Twenty-second	1888	1889 — 38
Ninth	1875	1876 — 24	Twenty-third	1889	1890 — 39
Tenth	*1876	1877 — 15	Twenty-fourth	*1890	Executive Department Report, Document 1, Part I. 1891.
Eleventh	1877	1878 — 20			
Twelfth	*1878	1879 — 22	Twenty-fifth	1891	1892 — 11
Thirteenth	*1879	1880 — 33	Twenty-sixth	1892	1893 — 10
Fourteenth	1880	1881 — 25	Twenty-seventh	1893	1894 — 10
Fifteenth	1881	1882 — 52	Twenty-eighth	1894	1895 — 10
Sixteenth	1882	1883 — 53	Twenty-ninth	1895	1896 — 10
Seventeenth	*1883	1884 — 55			

* Out of print.

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[General index to contents Engineering Department Reports, 1867–1892, will be found in Report of February 1, 1892.]

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